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United States  
Department of  
Agriculture

Forest Service

Tongass  
National  
Forest  
R10-MB-364

October 1998



# Crystal Creek Timber Harvest

## Record of Decision and Final Environmental Impact Statement



United States  
Department of  
Agriculture



ms

ANILCA

ASQ

AFHA

DEIS

FEIS

Forest Plan

GIS

HSI

IDT

LUD

LTF

MBF

MIS

MMBF

MMCF

NEPA

NFMA

OGRs

ROS

TTRA

VCU

VQO

WAA

Tongass Land and Resource Management Plan, 1997

Geographic Information System

Habitat Suitability Index

Interdisciplinary Team

Land Use Designation

Log Transfer Facility

Thousand Board Feet

Management Indicator Species

Million Board Feet

Million Cubic Feet

National Environmental Policy Act

National Forest Management Act

Old-Growth Habitat Reserves

Recreation Opportunity Spectrum

Tongass Timber Reform Act

Value Comparison Unit

Visual Quality Objective

Wildlife Analysis Area





United States  
Department of  
Agriculture

Forest  
Service

Alaska Region

Tongass National Forest  
Stikine Area  
P. O. Box 309  
Petersburg, AK 99833

File Code: 1950

Date: October 21, 1998

Dear Reviewer:

Here is your copy of the Final Environmental Impact Statement (EIS) and Record of Decision for the Crystal Creek Timber Harvest, Petersburg Ranger District, Stikine Area, Tongass National Forest. The Record of Decision explains my decision to select Alternative 6 as modified. I feel this EIS presents a balanced look at long term ecosystem management needs of this 64,000 acre project area which provides important wildlife habitat and recreation opportunities. This decision includes the harvest of approximately 13 million board feet of timber from 995 acres in 31 units and the construction of 13.7 miles of permanent road. Harvest prescriptions include clearcut with reserve trees, group selection, and single tree selection. No traditional clearcutting is proposed.

This decision also includes:

- modification of the small Old-growth Habitat reserve boundaries,
- creation of a balance of forage and winter habitat for moose,
- a recreation shelter and trail,
- second-growth management,
- road closures, and
- wetland enhancement projects.

The appeal filing period will begin the day after we publish notice in the Petersburg Pilot, the official newspaper for Record of Decisions made by the Stikine Area Assistant Forest Supervisor. This date is anticipated to be November 19, 1998. The appeal period will last 45 days. I expect the appeal deadline to fall on January 4, 1999. We will implement the decision no sooner than five working days after the close of the appeal period.

As the Stikine Area Assistant Forest Supervisor, I am responsible for this decision. Please direct any correspondence or request for additional copies to Bruce Sims, Crystal Creek Team Leader, P.O. Box 309, Petersburg, AK 99833, or call (907) 772-3841.

Sincerely,

CAROL J. JORGENSEN  
Assistant Forest Supervisor



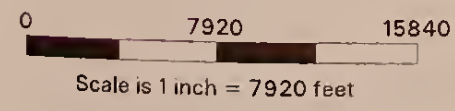




Legend

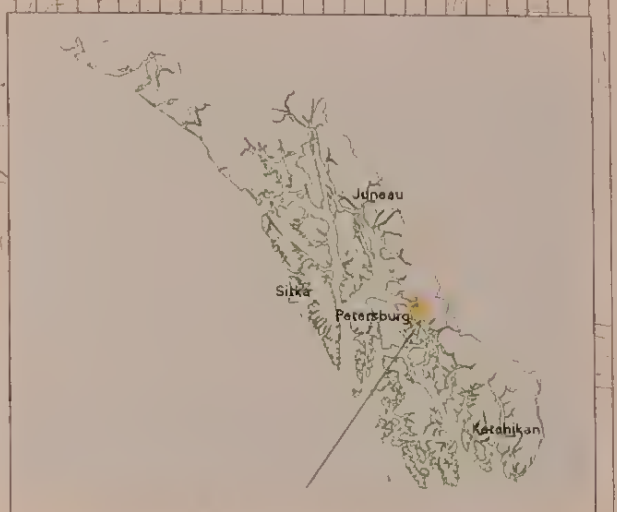
- PROPOSED HARVEST UNITS:
- Clearcut with Reserves
  - Group Selection - 30% Removal
  - Single Tree Selection - 20% Removal
  - Single Tree Selection

- Productive Old Growth
- Existing Managed Stands
- Proposed Pre-Commercial Thinning and Pruning Units
- Non-National Forest Lands
- Saltwater
- Wilderness
- Other Non-Development LUD
- Proposed Old Growth Habitat Reserves
- Crystal Creek Project Area Boundary
- Existing Permanent Roads
- Existing Closed Roads
- New Permanent Roads
- New Temporary Roads
- Shoreline, Lakes, Class I/II Streams
- Contour Interval 500 ft
- Log Transfer Facility (LTF)
- Ess Lake Shelter
- Wetland Enhancement Projects
- Temporary Road Closure Locations

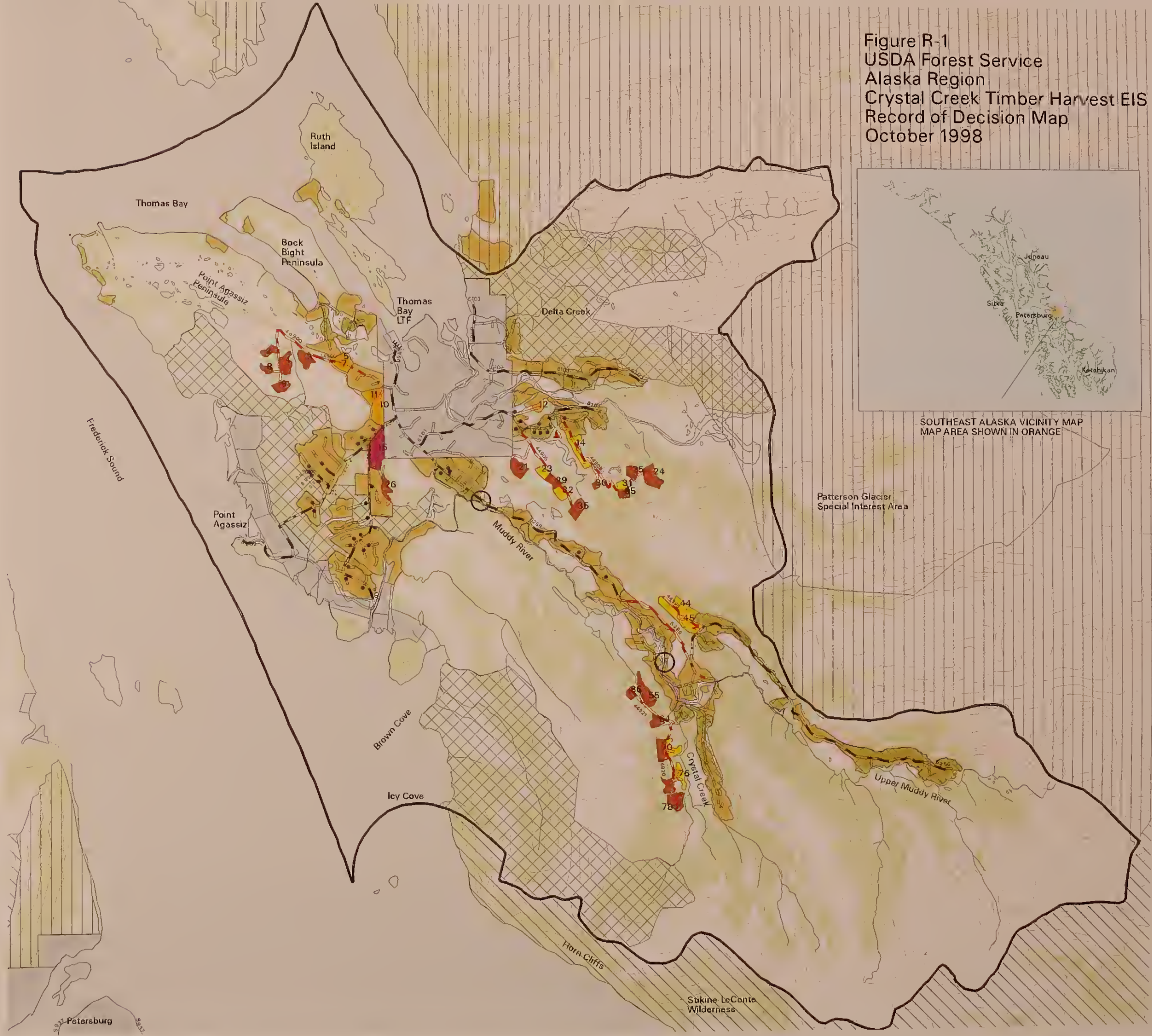


map: /gis/projects/crystal/plots/feisplots/rod.map 10/20/9B  
macros: feismap.aml, rod.aml

Figure R-1  
USDA Forest Service  
Alaska Region  
Crystal Creek Timber Harvest EIS  
Record of Decision Map  
October 1998



SOUTHEAST ALASKA VICINITY MAP  
MAP AREA SHOWN IN ORANGE







# Crystal Creek Timber Harvest Record of Decision

## Introduction

This Record of Decision documents my decision to select an alternative from the Crystal Creek Timber Harvest Environmental Impact Statement (EIS). This Decision includes the specific location and design of timber harvest units and roads, protection requirements for harvesting timber, and reconstruction of the Thomas Bay log transfer facility. The timber harvest is intended to be sold in several sales of varying sizes. In addition, this Decision includes a recreation shelter and access trail, adjustment of small Old-growth Habitat reserve boundaries, second-growth forest management activities, and wetland restoration/stabilization projects to provide the basis for long-term ecosystem management in the Crystal Creek project area.

## Background and Project History

The Crystal Creek Timber Harvest project is a component of the overall timber sale program on the Tongass National Forest. Timber sales are allowed by the 1997 Tongass Land and Resource Management Plan (Forest Plan) to maintain a supply of timber from National Forest lands for Southeast Alaska.

The project was first identified in the Stikine Area ten-year sale plan in 1992. The project first appeared on the Stikine Area Project Schedule in the Fall 1996 issue. Field inventory began in the summer of 1996. An open house was held at the Thomas Bay administrative site during the beginning of moose season in September 1996. A public scoping document was sent out in November 1996. Two open houses, one in Petersburg and one in Kake, were held that November after distribution of the scoping document.

The Notice of Intent to prepare an environmental impact statement for the project was published in the Federal Register in January 1997. An interagency field trip occurred in May 1997. Distribution of the Draft Environmental Impact Statement (DEIS) followed by open houses in Petersburg and Kake was in November 1997. The comment period on the DEIS ended on December 23, 1997. Comments were reviewed and addressed in the EIS; many of the comments were used to develop a new alternative, Alternative 6. The Crystal Creek Timber Harvest FEIS was prepared to disclose the environmental effects of the alternatives considered in detail. This Record of Decision culminates the planning process and documents the decision to authorize activities in the project area.

## Project Objectives

The Crystal Creek Timber Harvest Environmental Impact Statement responds to the goals and objectives of the 1997 Tongass Land and Resource Management Plan (Forest Plan) with an ecosystem management approach. One goal is to provide a supply of timber volume to the

# Record of Decision

timber industry to meet annual and planning-cycle market demand. During selection of units, opportunities for small operators were considered. All resources were analyzed. Scenery standards and guidelines were followed to make the timber harvest compatible with the Land Use Designations of Scenic Viewshed and Modified Landscape. Recreation opportunities were identified. Wildlife habitat values were considered and habitat management opportunities were included where feasible. Protection for all resources was achieved by meeting or exceeding the Standards and Guidelines of the Forest Plan.

## Decision

This Record of Decision documents my decision to implement activities in the Crystal Creek project area. My decision encompasses the following:

- ◆ whether or not timber volume should be made available for harvest, and if so, how much;
- ◆ the location and design of timber harvest units;
- ◆ the location and design of road construction and reconstruction;
- ◆ mitigation and monitoring measures associated with timber harvest;
- ◆ what balance will be achieved between forage and winter habitat for moose;
- ◆ whether or not to provide increased recreational developments;
- ◆ whether or not to enhance wetlands along the Muddy River Road (Road 6256);
- ◆ where to do second-growth management (thinning and pruning) to create forage for wildlife and enhance timber growth and value; and
- ◆ whether changes are needed for the design and/or location of the small Old-growth Habitat reserves identified in the Forest Plan.

**It is my decision to choose Alternative 6 from the Final EIS, as modified in the following paragraph, as the Selected Alternative for implementation in the Crystal Creek project area.** This decision meets the purpose and need for the project, is consistent with the Forest Plan, and is responsive to the concerns raised during scoping, analysis, and from public and agency comments.

I have decided to modify Alternative 6 by deleting Unit 50 and 1.2 miles of Road 44921. After completing the Final Environmental Impact Statement, a goshawk nest was found in the vicinity of this unit. During field inventories within the project area in 1996 and 1997, a goshawk was sighted in the area southwest of Brown Cove Lake but a nest was not located. In late July 1998, on follow-up surveys, a nest was discovered. I am deleting Unit 50 to provide nesting habitat for goshawks as required in the Forest Plan (page 4-91).

The Selected Alternative will harvest approximately 13 million board feet of timber and constructs approximately 13.7 miles of permanent road. All but 2.5 miles of the new road construction will be closed after harvest. In addition, 6.6 miles of existing open temporary road will be closed. Another 9.4 miles of existing open temporary road currently used by the public will be converted to permanent road status. The existing log transfer facility at Thomas Bay will be reconstructed. Several small sales will be made available. A recreation shelter and access trail will be constructed at Ess Lake. Two wetlands parallel to the Muddy



River Road will be enhanced or stabilized. Approximately 1600 acres of existing second growth will be thinned and/or pruned. Proposed activities are displayed in Appendix A of the EIS on the activity cards. A modified road card for Road 44921 has been added as Appendix 2 to the Record of Decision. All of these projects will be implemented as funding becomes available.

The three small Old-growth Habitat reserves in the Selected Alternative will modify the Forest Plan Old-growth Habitat Land Use Designation (LUD) by the net addition of 520 acres and the adjusted boundaries as shown on the Record of Decision Map. This change is a non-significant amendment as described in the Forest Plan on page 5-3 and Appendix 2 of this ROD. The change is a minor adjustment to the Land Use Designation boundaries based upon site-specific analysis.

## ***Subsistence***

I have determined that there is not a significant possibility of a significant restriction on subsistence uses of deer, mountain goats, moose, black bear, furbearers, fish, shellfish, marine mammals, plant foods, and timber as a result of this project. I have made this determination after careful review of the subsistence analysis and public input from subsistence users, the Petersburg Fish and Game Advisory Committee, and the Alaska Department of Fish and Game.

I have based this decision upon the results of analysis that included habitat modeling of wildlife capacity population trends, human population trends, subsistence use in the project area as well as subsistence use in areas that this project avoids. I believe the protection measures established by the Forest Plan and the project design will minimize impacts to subsistence resources.

## **Reasons for the Decision**

I have carefully reviewed the Forest Plan analysis and direction as it relates to this project, the analysis file for this document, and the input provided by the public. In making my decision, I considered all issues raised during the development and scoping of this project and took into account the competing interests and values of the public. Many divergent public, personal, and professional opinions were expressed during the analysis. This decision may not completely satisfy any one particular group or individual. However, I have considered all views and feel my decision is reasonable. The Selected Alternative provides a beneficial mix of resources for the public within the framework of the existing laws, regulations, policies, public needs and desires, and capabilities of the land while meeting the projects purpose and need. I believe that the Selected Alternative best meets the Forest Plan goals and objectives while balancing site-specific concerns unique to the project area and strengthens ecosystem management in the Crystal Creek project area.

I feel that the Selected Alternative includes several characteristics that best meet the issues identified. The Selected Alternative:

- ♦ allows harvest of 13 million board feet of timber, including the opportunity for sales of different sizes;

## Record of Decision

- ◆ provides long-term road management direction which will maintain current access and maximize resource protection;
- ◆ reconstructs the Thomas Bay Log Transfer Facility;
- ◆ allows construction of a three-sided recreation shelter and access trail at Ess Lake;
- ◆ enhances one wetland and stabilizes another wetland north of the Muddy River;
- ◆ creates forage for moose and deer use through second-growth management and the harvesting of low-volume timber stands;
- ◆ meets the Forest Plan guidelines of small Old-growth Habitat reserves and adjusts the boundaries of all three small Old-growth Habitat reserves to incorporate site-specific areas of high value wildlife habitat;
- ◆ protects the Horn Cliff mountain goat population with no timber harvest or road construction in the upper Crystal Creek drainage and through a public motorized road closure both during and after timber harvest activities at the bridge that crosses the Muddy River; and
- ◆ meets the desired condition for scenic quality, especially those areas that are viewed from Thomas Bay and Frederick Sound which are Visual Priority Routes and Use Areas.

In addition, the Selected Alternative addresses many of the concerns mentioned by the public and other government agencies such as:

- a variety of silvicultural prescriptions were used;
- road closures will be placed on 11.2 miles of new permanent and 6.6 miles of temporary roads after timber harvest activities are completed;
- a landscape connectivity corridor was maintained to connect the medium Old-growth Habitat reserve north of the project area to the medium Old-growth Habitat reserve (part of the Stikine-LeConte Wilderness) to the south of the project area;
- waterfowl nesting areas are protected by incorporating 330-foot partial harvest buffers and the use of harvest timing restrictions;
- a 100-acre habitat buffer is provided around a known goshawk nest;
- a known great blue heron nest is protected with a 600-foot buffer and timing restriction;
- areas of unstable soils and forested wetland soils identified in the Forest Plan were avoided in unit design;
- temporary bridges instead of culverts will be used at selected stream crossings to minimize effects to water quality;
- Best Management Practices, Riparian Management Areas, and careful road and harvest unit location will maximize protection for fish habitat and water quality;
- mountain goat travel corridors will be maintained between winter habitat areas on both sides of Crystal Creek, and
- no harvest was proposed in the area from Brown Cove Lake to Brown Cove to minimize effects on subsistence deer hunting.



### ***Social and Economic Considerations***

My decision is also based upon the comprehensive analysis of the social and economic environment of southeast Alaska, the Tongass National Forest, and the communities within these areas provided in the Forest Plan FEIS, Part 2, Chapter 3. This analysis includes detailed information on industries directly dependent on the Tongass National Forest including timber, recreation, and the tourism industry. This information includes, among other things, employment data, baseline employment levels, estimated employment and income levels, and potential effects on communities. The Forest Plan concludes that employment in the recreation and tourism industry is expected to increase. In addition, the Forest Plan reflects an alternative that was chosen to manage the Tongass National Forest for the highest net public benefit. The Crystal creek project was prepared, in part, to implement the Forest Plan, and was designed to be fully consistent with the applicable management direction and standards and guidelines of the Forest Plan.

After reviewing the Crystal Creek analysis, the Forest Plan analysis, the social and economic analyses from the recent Control Lake, South Lindenberg, and Crane Rowan EISs, and the *Economics in Transition: An Assessment of Trends Relevant to Management of the Tongass National Forest* (1998) report, I have determined that there will not be any significant impact on employment or income opportunities in the recreation or tourism industry because of the relatively low level of recreation activity taking place in the project area and because the important recreation places and sites have been protected. The recreational opportunities will change but are expected to increase and will be enhanced with an additional trail and shelter. The visual resource is protected by meeting visual quality objectives. The fishing industry will not be affected due to the careful design and protective measures used in the project for stream, riparian, and soil resources, and the enhancement of wetlands. The Crystal Creek project will have positive economic and fiscal impacts as direct and indirect employment related to timber harvesting and processing will increase. Tax receipts will be generated from increased employment.

I have not found any potential external economic factors which would influence my decision.

In regards to the current volatile timber markets, timber demand must be viewed from a programmatic prospective and considered over time. This project is only a small part of the Tongass timber program. Based upon the Forest Plan analysis and public input to the timber program, there is demand for timber from this project. Timber sales offered over the past several years on the Petersburg District have had multiple bidders and have been bid at or above advertised rates. Timber operators continue to express interest in sale offers.

Also, in order to schedule future timber offerings in an orderly manner and to be able to schedule those offerings in the size and configuration which best meets the public need, the Forest Service needs to maintain an adequate timber volume which is "available for sale" in its program. At the present time, the Forest Service has insufficient timber volume available for sale. The Crystal Creek timber project is an important component of the Tongass National Forest timber outputs to meet the obligations under Section 101 of the Tongass Timber Reform Act (TTRA). The project will help to provide the timber volume available for sale needed for orderly management of the timber sale program.

Additional rationale for my decision can be found in the individual responses to comments in Appendix B of the Crystal Creek Timber Harvest Final Environmental Impact Statement. I have carefully considered all comments, which has helped me make this a better decision.

My decision to implement the Selected Alternative is in conformance with the Tongass Land and Resource Management Plan (1997) and sound National Forest management. In making my decision, I have balanced the need to support community stability, by maintaining the overall health of the ecosystem and maintaining a current timber supply, with the need to provide strong protection measures for biodiversity, soil, water, fish, scenic quality, subsistence, and wildlife. The need to maintain a long-term balance between moose forage and forest cover was also carefully considered.

During the location and design of harvest units, careful consideration of the impacts to scenery were considered and minimized. The resultant design will not significantly affect the use of recreationists or those involved in providing recreation opportunities to others. All Forest Plan Riparian Standards and Guidelines were used where applicable. These will minimize any adverse effects to fisheries and those people who use the fisheries for recreation or commercial purposes.

I have considered the subsistence effects on this project and have found that no significant possibility of a significant restriction for abundance and distribution, access, or competition was found for the Selected Alternative or any other alternative.

## Significant Issues

In making my decision, I carefully considered how the Selected Alternative addressed each of the five significant issues identified during the planning process.

### *Issue 1: Timber Management and Economics*

The Selected Alternative uses a variety of silvicultural prescriptions to increase stand diversity and wildlife habitat. Approximately 490 acres will be harvested using a clearcut with reserve trees silvicultural prescription which retains approximately 15 percent of the green trees in the stand. Approximately 85 acres will be harvested in 2 acre patches using a group selection prescription with a 70 percent green tree retention in the stand. Single tree selection will be applied over 141 acres with an 80 percent retention of green trees in the stand. Another 83 acre unit will be divided into four areas and harvested using single-tree selection at varying levels of retention to test wildlife use at different harvest levels. Ground-based yarding methods will be used; no helicopter harvest is planned.

The Selected Alternative will provide approximately 13 million board feet (MMBF) of timber volume, which contributes to the Forest Service's objective to seek to meet market demand while being consistent with the Forest Plan and the standards and guidelines for all resources. Timber from this sale will be used to help provide an even flow of timber to industry over the ten year planning cycle. This timber volume is a component of the timber sale program to be offered during the next five to ten years on the Stikine Area to help meet annual market



demand. The Selected Alternative is the second most economical alternative. Timber markets tend to fluctuate dramatically but I expect that these sales will sell at or above the advertised rates based upon recent timber bids on the Stikine Area.

An economic comparison of the alternatives was done using the Region 10 residual value appraisal method. This method used historical values and costs and is only useful to obtain a relative ranking of the alternatives. The actual net values of the timber sales will be known when bids have been received and the sale is awarded to the highest bidder. The analysis showed that all action alternatives have a negative appraised net value based upon historic costs and values. Alternative 5 is the most economic alternative. Alternative 6 is the second most economical, closely followed by Alternative 3. Alternative 2 is the least economical. Although the net stumpage values are negative, based on historic values, the actual sale values may be considerably higher depending on actual market conditions at the time of the sale. Timber markets and values tend to fluctuate dramatically. Sales over the past several years on the Petersburg Ranger District have had multiple bidders and have been bid up above advertised rates.

Seven units were located on or near the existing road system and could provide several small sale opportunities after the reconstruction of the Log Transfer Facility (LTF). Several of these units contain trees sought for value-added products. These units will be considered for small sales based on local market demand. Only two sales are currently shown on the ten-year timber sale plan but this plan will be updated in 1999 to reflect this decision (and others made recently). Other opportunities may exist by deferring the harvest of some units along planned roads until after the larger sale is harvested.

## ***Issue 2: Moose Management***

The Selected Alternative was designed to allow for spatial distribution of moose forage production while maintaining adequate high volume forest cover (winter habitat). The project area was sub-divided into four Moose Habitat Management Areas. Each area was analyzed to determine the optimum forage to winter habitat ratio. To maintain forage production for moose, thinning and harvest needs were identified for each moose habitat area. The Selected Alternative identifies about 1,600 acres of second-growth for thinning and 575 acres of old-growth for clearcut with reserve and group selection harvest. Only Alternative 2 would provide a slightly better distribution of forage for moose across the project area than the Selected Alternative. The Selected Alternative meets the identified winter moose habitat needs throughout the project area. Moose habitat capability for the Selected Alternative is expected to increase over the No Action Alternative by about 4 percent for the next 20 to 30 years.

## ***Issue 3: Biodiversity***

Biodiversity was examined by focusing on the following three aspects:

1. maintenance of old-growth habitat,
2. protection of highest volume old-growth stands, and
3. the effect of timber harvest on old-growth associated species.

The variety of harvest prescriptions used should further increase biodiversity. These prescriptions include single tree selection, group selection with openings less than two acres, and clearcut-with-reserves that retain approximately 15 percent or more of the basal area within the units. The clearcut-with-reserves prescription will result in a second-growth stand with vertical structure that is beneficial for many wildlife species.

### *Maintenance of Old-Growth Habitat*

Biodiversity was maintained by modifying all three small Old-growth Habitat reserves within the project area. The reserves were modified to better retain high volume forest stands, maintain the old-growth habitat connectivity corridors, and/or protect site-specific high value wildlife habitat. These modifications were done in consultation with the United States Fish and Wildlife Service and the Alaska Department of Fish and Game.

Currently there are about 24,600 acres of productive old-growth on National Forest lands in the project area. This is about 83 percent of the old-growth present in 1954 prior to the start of large-scale logging. The Selected Alternative would harvest approximately 575 acres or 2.3 percent of this remaining old-growth. Some of this remaining old-growth will be retained indefinitely because it is located in beach buffers, riparian buffers along streams, and on slopes greater than 72 percent.

The following modifications are part of the Selected Alternative (Figure R-1):

- ◆ The Delta Creek small Old-growth Habitat reserve as displayed in the Forest Plan does not meet the total acreage needed for VCU 487. It is modified to eliminate second-growth units, add high-value mountain goat winter range, and maintain a corridor to the Patterson River Glacier Special Interest Area (a non-development Land Use Designation). The size increases by approximately 1300 acres to 4,100 total acres. This includes an increase of 660 acres of the productive old-growth component of the reserve.
- ◆ The Point Agassiz small Old-growth Habitat reserve combined with the Brown Cove small Old-growth Habitat reserve does meet the Forest Plan size criteria. Modifications were made to better address some of the other criteria of reserve designation. The Point Agassiz small Old-growth Habitat reserve is modified to include some of the highest volume old-growth stands and maintain connectivity to the Muddy River riparian corridor. Some low-volume fragmented stands within riparian and beach buffers in the northwest part of Point Agassiz Peninsula were excluded. The total size decreases by approximately 80 acres to 2,270 acres. However, the productive old-growth component increases by 140 acres over the Forest Plan design.
- ◆ The Brown Cove small Old-growth Habitat reserve combined with the Point Agassiz small Old-growth Habitat reserve does meet the Forest Plan size criteria. Modifications were made to better address some of the other criteria of reserve designation. The Brown Cove small Old-growth Habitat reserve is modified to include more moderate mountain goat winter habitat, maintain corridors to a medium Old-growth Habitat reserve (the Stikine-LeConte Wilderness), and delete the knoll west of Brown Cove because of lack of old-growth connectivity. The total size increases by approximately



190 acres to 4,480 total acres, which includes a 90 acre increase in the productive old-growth component of the reserve.

There is limited habitat connectivity between the medium Old-growth Habitat reserves to the north and south of the project area due to the Muddy and Patterson Rivers and previous harvest. To help remedy this situation, an old-growth corridor was identified and maintained in the Selected Alternative. This corridor is located in the eastern part of the project area and crosses the Muddy and Patterson Rivers at areas of the most contiguous old-growth (Figure 3-7, Crystal FEIS).

### ***Protection of Highest Volume Old-Growth Stands***

About ninety-two percent of the highest volume old-growth will remain after harvest. About 141 acres of the highest volume old-growth stands (stands with more than 30,000 board feet per acre) are added to the Point Agassiz small Old-growth Habitat reserve. Under the Selected Alternative, about 199 acres will be harvested using single-tree selection which will maintain large old-growth trees to provide habitat for wildlife. About 34 unit acres will be partially harvested. This will create a mosaic of highest volume timber interspersed with small openings.

### ***Effect of Timber Harvest on Old-Growth Associated Species***

Management Indicator Species were used as a measure of biodiversity. The Management Indicator Species associated with old-growth for the project area are: marten, deer, brown creeper, wolf, mountain goat, moose, and Canada geese. The Selected Alternative is expected to decrease, over the No Action Alternative, marten carrying capacity by 1.0 percent, deer carrying capacity by 1.4 percent, and brown creeper carrying capacity by 0.4 percent by the year 2040. The Selected Alternative is estimated to result in a mountain goat carrying capacity decrease of less than one animal. The Selected Alternative should maintain sufficient prey to support the existing wolf carrying capacity. Canada geese nesting areas are protected by buffers and harvest restrictions to minimize effects. Moose habitat capability will be increased into the future by four percent over current conditions.

The Selected Alternative affects 224 acres of mostly marginal mountain goat winter range. To minimize access to the Horn Cliff mountain goat population, the Selected Alternative builds less road into the Crystal Creek drainage than Alternatives 2 and 3 and does not harvest any units south of Unit 78. A public motorized road closure during timber harvest and closing the road after timber harvest at the bridge across the Muddy River will minimize disturbance to the Horn Cliff goat population.

Forest Plan Standards and Guidelines for the Alexander Archipelago wolf recommend open road densities of 0.7 to 1.0 miles per square mile where wolf mortality is a concern (Forest Plan, page 4-116). In the Selected Alternative, the open road density after timber harvest will be 0.29 miles per square mile, slightly less than the existing condition since some currently open temporary road miles will be closed.

## *Issue 4: Recreation*

The Selected Alternative maintains all existing recreation uses within the Planning Area. These uses include: moose and deer hunting, bicycling, sight-seeing, camping, and freshwater fishing. In addition, a recreation shelter and short access trail is included in the Selected Alternative. This shelter will be located beside Ess Lake and accessed from Forest Road 6101, south of the Patterson River. No trails along the Patterson River are planned at this time due to public comments.

Moose hunting is the most important single recreation/subsistence activity within the Planning Area. Annual average moose harvest is about 19 animals. Existing road access to hunting areas and camps will be maintained.

Brown Cove and Brown Cove Lake areas are important deer hunting areas for local residents. No new roads or timber harvest units were proposed in these areas to maintain the existing conditions.

The existing road access will be maintained and the road realignment of the Muddy River Road will be available for public use. All but 2.5 miles of new roads constructed for the Selected Alternative will be closed to motor vehicles after timber harvest but will be available for hiking, mountain bike use, and most will be available for all-terrain vehicle use.

Scenic quality from Thomas Bay and Frederick Sound will be protected in the Selected Alternative through use of unit design and silvicultural prescriptions other than clearcutting. The silvicultural prescriptions will retain varying amounts of green trees within the units.

## *Issue 5: Transportation*

The existing road system within the project area includes approximately 28.4 miles of permanent road and 28 miles of temporary road. Of these miles, approximately 17.2 miles of permanent road are open and 16.0 miles of temporary road are open. The Selected Alternative will construct an additional 13.7 miles of permanent road and 6.8 miles of temporary road. After harvest, 29.1 miles of permanent road will be open in the project area. Nearly all new roads will be closed following harvest activities. The road realignment constructed for the Muddy River Road (Road 6256) will remain open. A 1.15 mile portion of Road 44900 will also be kept open. The existing permanent road system will remain open. Approximately 6.6 miles of existing temporary road which has not received recent public use will be closed. About 9.4 miles of existing temporary road currently used by the public will be converted to permanent road. The Thomas Bay Log Transfer Facility (LTF) will be reconstructed.

The Selected Alternative includes temporary bridges instead of culverts at specified stream crossings as recommended by the Alaska Department of Environmental Conservation and adapted as provisions during the Alaska Coastal Management Plan (ACMP) review. These bridges will be designed so that they can be removed and reused at other locations.



## Public Involvement

On-going public involvement has been instrumental in identifying and clarifying issues for this project. This has been helpful in the formulation of alternatives and has assisted me in making a more informed decision for the Crystal Creek Timber Harvest project. Public meetings, Federal Register notices, newspaper and radio releases, open houses, the Stikine Area Project Schedule, and group and individual meetings were used to solicit public input for this project.

**Notice of Intent:** A Notice of Intent to Prepare an Environmental Impact Statement was published in the *Federal Register* on January 29, 1997.

**Public Comment received for the Draft EIS:** Public comments to the Crystal Creek Timber Harvest Draft EIS were received from early November until December 23, 1997. A total of 13 letters were received during the comment period and were formally responded to in the Final EIS, Appendix B. Many comments were incorporated in the development of Alternative 6, which was modified for the Selected Alternative.

## Coordination With Other Agencies

The Forest Service is committed to working closely with other agencies and tribal governments in order to foster collaborative stewardship.

In November 1996, scoping documents were sent to the Alaska Division of Governmental Coordination which is the clearing house for all State of Alaska agencies. In addition, scoping documents were sent directly to the Alaska Department of Fish and Game, Alaska Department of Environmental Conservation, and Alaska Department of Natural Resources. Federal agencies that received scoping documents included the U. S. Fish and Wildlife Service, National Marine Fisheries Service, and the Environmental Protection Agency. Comments were received from all of the above agencies except the Alaska Department of Natural Resources and the National Marine Fisheries Service.

In order to foster collaborative stewardship and information sharing, in May 1997, these agencies were invited on a field review of the Crystal Creek Project Area. Representatives from the U. S. Fish and Wildlife Service, U. S. Army Corps of Engineers, Alaska Department of Fish and Game, and Alaska Department of Environmental Conservation participated in this review.

In October 1997, a meeting was held to review the Crystal Creek analysis to ensure compliance with the Forest Plan as described under Transition to the Revised Plan (Forest Plan ROD, pages 41 and 42). In attendance was an interagency implementation team consisting of personnel from the National Marine Fisheries Service, Environmental Protection Agency, Alaska Department of Fish and Game, Alaska Department of Environmental Conservation, and the Forest Service.

All agencies received copies of the DEIS. Comments were received from the U. S. Fish and Wildlife Service, Army Corps of Engineers, Alaska Department of Fish and Game, and

Alaska Department of Environmental Conservation. These comments are found in Appendix B. A meeting with the U. S. Fish and Wildlife Service occurred after the comment period to collaboratively establish small Old-growth Habitat reserve boundaries.

The Organized Village of Kake, a Federally Recognized Tribal Government, has been contacted about this project. In October 1996, they were contacted to see what interest they had in the project. An open house, with an emphasis on archaeology, was held in Kake in November 1996. The Petersburg Indian Association was contacted numerous times to inform them of the project. An open house was held in Petersburg in November 1996, which included a poster and questionnaire on archaeology.

The Final EIS identifies the agencies that were informed of and/or involved in the planning process (see List of Agencies, Organizations, and Individuals to Whom Copies of this Statement Were Sent in Chapter 4).

## Alternatives

### *Alternatives Considered for Detailed Evaluation*

Five alternatives were considered in detail in the Final EIS. Each action alternative is consistent with the Tongass Land and Resource Management Plan (1997). Alternative 4 from the DEIS was dropped from further consideration. For a complete description of these alternatives, refer to Chapter 2 of the Final EIS.

I believe the range of alternatives developed for this project was well crafted to respond in varying ways to the issues, and explored viable options for achieving the purpose and need. While it is not possible to develop an alternative for every contingency, the ones developed for this project clearly evaluated reasonable trade-offs between the issues identified during the planning process.

**Alternative 1** - This alternative proposed no additional commercial timber harvest or road construction in the Crystal Creek project area. Activities, such as second-growth management, road closures, road maintenance, personal-use timber, and existing recreational developments will remain at current levels. Alternative 1 contains the small Old-growth Habitat reserves as designed by the Forest Plan.

**Alternative 2** - This alternative sustained a balance between high production forage and moose winter habitat. It includes the recreation shelter and trail, second-growth management, road closures, and wetland enhancement projects. This alternative includes minor modification of the Point Agassiz and Brown Cove Old-growth Habitat reserves designed by the Interdisciplinary Team to make them easier to identify on the ground and enlargement of the Delta Creek Old-growth Habitat reserve to meet the Forest Plan criteria for productive old-growth.

**Alternative 3** - This alternative emphasized harvesting within the Timber Production and Modified Landscape Land Use Designations and avoided timber harvest in the Point Agassiz area. Helicopter logging was proposed to harvest about one-third of the volume.



Alternative 3 includes second-growth management, road closures, and wetland enhancement projects. The Point Agassiz and Brown Cove Old-growth Habitat reserves in this alternative were proposed by the U. S. Fish and Wildlife Service during the scoping process.

**Alternative 5** - This alternative focused on harvesting from the existing road system while still dispersing timber harvest enough to address resource concerns and meet Forest Plan Standards and Guidelines. One-third of the units were designed for shovel-logging. This alternative maximized opportunities for small sales along the existing road system. It includes second-growth management, road closures, and the recreation shelter and trail. The Old-growth Habitat reserves are the same as Alternative 2.

**Alternative 6** - This alternative, which was based on Alternative 2, was designed after comments on the Draft EIS were received. Unit 81 and part of Road 44920 were deleted to minimize disturbance to the Horn Cliff mountain goat population. Several single-tree selection units were added to create more opportunities for small sales on the existing road system. Alternative 6 includes the recreation shelter and trail, second-growth management, road closures, and wetland enhancement projects. The Old-growth Habitat reserves in Alternative 6 were developed during an interagency meeting with the U.S. Fish and Wildlife Service and the Forest Service Interdisciplinary Team with input from the Alaska Department of Fish and Game.

### ***Environmentally Preferred Alternative***

Based on a comparison of all alternatives and discussion contained within Chapter 3 of the Final EIS, Alternative 1 would cause the least environmental disturbance with the exception of the decline in moose habitat.

Of the action alternatives and considering all ecosystem factors including the human environment the Selected Alternative is the environmentally preferred alternative that best addresses the variety of issues and public comments received on the Crystal Creek project. This alternative protects biodiversity and distributes moose habitat throughout the planning area. Mountain goat habitat is protected within the headwaters of the Crystal Creek drainage. About 6.6 miles of presently existing temporary roads will be closed and natural drainage restored. All but 2.5 miles of new road construction will be closed following harvest activities. One wetland will be enhanced by raising the water level and a second will be protected from erosion by the Muddy River.

### ***Alternatives Not Considered in Detail for the Final EIS***

Three alternatives were not considered in detail for the Final EIS:

**Alternative 4** - This alternative was dropped from further analysis between draft and final EIS. This alternative relied heavily on the use of cable-systems to harvest openings 3/4 acre or less in size. Further analysis indicated that this was not practicable and limited further entry options.

**Narrows Conservation Coalition Alternative** - This alternative proposed harvesting approximately one half million board feet of timber within Units 44, 64, and 67, using

## Record of Decision

group selection prescriptions. This proposal would not be economically viable since such a small timber volume would not cover the costs of reconstruction of the LTF, major road and bridge construction, and/or the cost of mobilization of a helicopter.

**No New Roads Alternative** - This alternative would have resulted in harvesting only in the remaining high volume timber stands in the Point Agassiz glacial outwash landform. Biodiversity would have been affected and future forage production would have been concentrated in only one location. The goals and objectives of the Forest Plan would not have been met to the extent of the other action alternatives and the area would not have moved toward the desired future condition.

In addition to these alternatives, several areas within the project area were not considered for harvest during alternative development:

- ♦ **Harvesting Timber in the Headwaters of the Muddy River, the East Fork of Crystal Creek, and the Upper Patterson River** - Road construction and helicopter logging of this area would be more cost effective at a later date following road construction this entry. Timber harvest in this area may be analyzed during the next harvest entry.
- ♦ **Harvesting Timber North of the Patterson River** - There is not enough commercial timber suitable for harvest to warrant the cost of the reconstruction of the transportation system. Future timber harvest may be planned in this area when second-growth timber becomes large enough to commercially harvest.
- ♦ **Harvesting Timber on Ruth Island, Bock Bight Peninsula, and Point Agassiz Peninsula** - Much of the timber in these areas is within riparian and beach buffers which are designated by the Forest Plan as unsuitable for timber harvest. These areas have small amounts of suitable timber but costs associated with harvest will be high.

Two areas were examined for the relocation of the small Old-growth Habitat reserves but eliminated from further consideration:

- **Ess Lake Area Old-growth Habitat Reserve** - This area was examined to replace the Delta Creek Old-growth Habitat reserve. Examination showed that the Delta Creek Old-growth Habitat reserve contained a greater concentration of higher volume old-growth and more valuable mountain goat winter habitat.
- **Muddy River Headwaters Old-growth Habitat Reserve** - This area was proposed as a replacement for either the Brown Cove Old-growth Habitat reserve or the Point Agassiz Old-growth Habitat reserve. It was eliminated from further study because it provided less connectivity to the medium Old-growth Habitat reserve to the south of the project area and was less valuable for deer winter habitat.

**Road 6256 was considered for reconstruction.** The Muddy River continues to erode this route. The FEIS recommends construction of an alternative route to avoid the Muddy River.

## Administrative Record

The Administrative Record for this project includes the Draft EIS, Final EIS, Tongass Land and Resource Management Plan, and all material incorporated by reference including the planning record.



## Mitigation

Mitigation includes measures taken to avoid, reduce or minimize the adverse effects of actions. These measures were applied in the development of the project alternatives, including the Selected Alternative, and in the design of the harvest units and road corridors. Mitigation measures applicable to the Selected Alternative include measures contained in the Tongass Land and Resource Management Plan (1997) and in applicable Forest Service Manuals and Handbooks. The Final EIS includes mitigation measures as described in Chapter 2 and site-specific mitigation measures on the Activity Cards located in Appendix A. These measures are adopted as part of this decision and will be implemented. All Forest Plan Standards and Guidelines will be utilized to avoid or minimize adverse environmental effects of the Selected Alternative.

## Monitoring

A monitoring program is the process by which the Forest Service can evaluate whether the resource management objectives of the final environmental documents have been implemented as specified and whether the steps identified for mitigating the environmental effects were effective. Monitoring requirements are specified in Chapter 2 of the Final EIS. These monitoring items are adopted as part of this decision and will be implemented.

Each monitoring item describes the item and states what the information will tell us, and how it will be done. If monitoring activities reveal results that deviate from those expected corrective actions will be taken where appropriate.

## Findings Required By Law

### *National Forest Management Act*

The National Forest Management Act (NFMA) requires specific determinations in this Record of Decision: consistency with existing Forest Plans and Regional Guides (36 CFR 219.8 through 13), a determination of the optimal method of harvesting (36 CFR 219.27(b)), and specific authorizations of created openings over 100 acres in size (36 CFR 219.27(d)(2)).

### *Tongass Land and Resource Management Plan and Alaska Regional Guide*

This decision is consistent with the Alaska Regional Guide and the Tongass Land and Resource Management Plan (Forest Plan). I have reviewed the management direction and standards and guidelines for the Land Use Designations (LUDs) included in the Crystal Creek project area, and find the Selected Alternative to be consistent with these elements.

### *Transition to the Forest Plan*

The Forest Plan, Record of Decision (page 41), places certain requirements on timber sale projects for which environmental analysis had begun, but no NEPA decision made at the time of the effective date for implementation of the Forest Plan (July 31, 1997). There are two requirements:



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- 1) projects must be consistent with all applicable management direction of the proposed plan, and
- 2) where needed, additional measures for landscape connectivity, endemic terrestrial mammals, northern goshawks, and American marten as described in the Record of Decision and Final EIS for the Forest Plan will be incorporated; this need will be determined through interagency review.

I have determined, through review of the analysis in the Final EIS for the Crystal Creek Timber Harvest, that this project incorporates all applicable management direction from the Forest Plan and is fully consistent with its goals, objectives, Forest-wide standards and guidelines, and management area prescriptions as they apply to the project area. The required interagency review and analysis of the need for additional measures was accomplished, and these measures have been included.

The following measures were incorporated for the additional standards and guidelines described in the Record of Decision, Final EIS and Forest Plan.

- ♦ *Landscape connectivity corridor* - An old-growth corridor was identified that would connect the medium Old-growth Habitat reserve north of the project area with the Stikine-LeConte Wilderness to the south of the project area.
- ♦ *Endemic terrestrial mammals* - Since the project area is not located on an island less than 50,000 acres, surveys for endemic mammals were not required. However, graduate students from the University of Alaska at Fairbanks conducted small mammal surveys during 1997 within the project area which is being incorporated into ongoing genetic studies.
- ♦ *Northern goshawk* - Surveys were done within the project area during the 1996 and 1997 field seasons using the regional protocol. Any observation that suggested nesting activity was followed by more intensive surveys by wildlife biologists. A northern goshawk nest was found in Unit 50. A 100-acre nesting habitat area was maintained around the nest. This unit and its access road were dropped from the Selected Alternative. Further surveys will occur during the implementation of the project.
- ♦ *American marten* - Although road access was not determined to significantly contribute to an unsustainable marten mortality, all but 2.5 miles of the roads constructed for this project will be closed after timber harvest is complete. Since the project area is not located in a higher risk biogeographic province; the standards and guidelines for forest stand structure do not apply. However, all timber harvest units in the Selected Alternative will retain at least 15 percent of the green trees within the unit. Single-tree selection, that retains 80 percent of the green trees, is prescribed for most of the highest volume timber stand harvest units. Large trees that can be used for marten habitat will be retained.

## *Optimal Methods of Harvesting*

Of the 31 harvest units planned in the Selected Alternative, 17 units and parts of two other units will be managed for timber production with a single regeneration harvest. These

units will include green tree retention of approximately 15 percent of the stand which will result in conversion to a two-aged stand with most of the trees at one age. The remaining units have a stand objective of uneven-aged management which will be accomplished by harvest in multiple entries (Forest Plan, pages 4-97 and 4-98).

#### *Two-aged Stand Management*

The clearcut-with-reserves prescription will have clumps or scattered green trees remaining after harvest. This prescription will result in a more diverse post-harvest stand structure which will be more visually pleasing and provide better wildlife habitat than conventional clearcuts. At the time of harvest, these clumps/trees will be selected for windfirmness, the relative absence of disease and dwarf mistletoe, wildlife attributes, and noncommercial value.

I have determined that the use of regeneration harvest with reserves to achieve the unit objective of maintaining fast-growing, healthy stands of mixed species is an appropriate silvicultural method for this project for the reasons listed below.

- ◆ The thin bark and shallow roots of hemlock and spruce make them particularly susceptible to logging injury, which leads to decay. Losses from decay fungi are high, especially in the old-growth forests of Alaska. Conversion of old-growth to second growth has the greatest potential for decreasing decay. Leaving reserve trees in clumps should minimize the potential for logging injury to the residual reserve trees in units that are cable yarded.
- ◆ Exposure of soil to the sun raises the temperature which speeds decomposition and nutrient cycling, improving site productivity rapidly.
- ◆ Regeneration of Sitka spruce is favored by elimination of advanced hemlock regeneration and exposing mineral soil.
- ◆ Logging costs are lower than other silvicultural methods.
- ◆ Forage production of herbaceous species is increased with increased sunlight.
- ◆ Hemlock dwarf-mistletoe is best managed by removing infected trees. Reserve trees will generally be mistletoe-free.
- ◆ Reserve trees provide stand structure and are used for wildlife habitat, provide future snags and down-dead logs.
- ◆ Reserve trees increase soil stability by the maintenance of their root systems.

#### *Uneven-aged Stand Management*

For harvest units with stand objectives of uneven-aged management, the silvicultural prescriptions are either group selection or single tree selection. A more detailed discussion of each of these units can be found in Appendix A of the Final EIS. I have determined that the use of uneven-aged management methods to achieve the stand objectives for specific units are appropriate silvicultural methods for this project for the following reasons:

- ◆ preserves and enhances the diversity of plant and animal communities,
- ◆ emulates the maintenance of natural old growth,



## Record of Decision

- ◆ maintains a snow interception canopy for winter habitat and large trees for wildlife,
- ◆ maintains scenic quality,
- ◆ can be achieved safely with uphill yarding systems or ground-based systems, and
- ◆ remaining stand structure will provide soil stability.

***Harvest Openings Over 100 Acres in Size*** - There are no harvest openings over 100 acres proposed for this project.

### ***Tongass Timber Reform Act (TTRA)***

Harvest units were designed and located to maintain a minimum 100-foot buffer zone for all Class I streams and Class II streams that flow directly into Class I streams as required in Section 103 of the TTRA. As discussed in Appendix A of the Final EIS, the actual widths of these buffer strips will often be greater than the 100-foot minimum to follow the Riparian Standards and Guidelines in the Forest Plan. The design and implementation direction for the Selected Alternative incorporates Best Management Practices (BMPs) for the protection of all stream classes.

This project will help to meet southeast Alaska's annual timber demand needs and contribute to the market demand over the Forest planning cycle while providing for multiple use and sustained yield of all renewable forest resources.

### ***Endangered Species Act***

Actions authorized in the Selected Alternative are not anticipated to have a direct, indirect, or cumulative effect on any threatened or endangered species in the Crystal Creek project area or elsewhere. The U.S. Fish and Wildlife Service and the National Marine Fisheries Service have concurred that the actions described within the proposed project are not likely to adversely affect threatened and endangered species. A complete biological assessment is included in the planning record for this project. I have determined that this action will not have any significant adverse impacts on any threatened or endangered species.

### ***Bald Eagle Protection Act***

Management activities within 330 feet of an eagle nest site are restricted by a Memorandum of Understanding (MOU) between the Forest Service and the U.S. Fish and Wildlife Service to comply with the Bald Eagle Protection Act. The Selected Alternative is not anticipated to have a significant direct, indirect, or cumulative effect on any bald eagle habitat. If any nests are found that may be affected, the MOU and Forest Plan Standards and Guidelines will be followed.

### ***Clean Water Act***

The design of harvest units and roads for the Selected Alternative was guided by standards, guidelines and direction contained in the Tongass Land and Resource Management Plan, Alaska Regional Guide, and applicable Forest Service manuals and handbooks. The Activity Cards (Appendix A) contain specific details on practices prescribed to prevent or reduce non-



point sediment sources. Reasonable implementation with site-specific application and monitoring of approved BMPs is expected to comply with applicable State Water Quality Standards Regulations.

These regulations provide for variances from anti-degradation requirements and water quality criteria. The harvest and road building operators will be responsible for compliance, including obtaining any variance required by the State. Compliance will be monitored by Forest Service personnel. The Forest Service expects the Crystal Creek Timber Harvest activities to fully qualify for any variance required by the State, according to the criteria in 18 AAC 70.015.

To reduce any adverse impacts, all roads, landings, and rock pits for this project will be designed to minimum standards to accommodate timber harvesting and silvicultural activities and will be constructed in accordance with Best Management Practices listed at 33 CFR 323.4(a). Therefore, no permits under Section 404 of the Clean Water Act are required.

### ***National Historic Preservation Act***

Cultural resource surveys of various intensities have been conducted in the project area. These surveys included background and existing literature searches and fieldwork complete with subsurface testing. Public comment was encouraged at open houses held in Petersburg and Kake. A questionnaire available at the meetings elicited information about known or suspected cultural resources in or near the project area. The State Historic Preservation Officer has been consulted, and I have complied with the provisions of 36 CFR part 800. I have determined that there will be no significant effects on known cultural resources.

### ***Federal Cave Resource Protection Act of 1988***

The actions in the Selected Alternative will not have a direct, indirect, or cumulative effect on any significant cave in the Crystal Creek project area. No cave resources have been documented in the project area, and no caves were discovered during field work done for this analysis.

### ***ANILCA Section 810, Subsistence Evaluation and Findings***

A subsistence evaluation was conducted for the five alternatives considered in detail, in accordance with ANILCA Section 810. The evaluations in the Subsistence Report on abundance and/or distribution, access and competition for harvested resources in the project area indicate that there will not be a significant restriction on subsistence uses of wildlife, fish, and shellfish, marine mammals, other foods, and timber resources as a result of this project. I have made the determination there is not a significant possibility of a significant restriction to subsistence.

### ***Coastal Zone Management Act***

The Coastal Zone Management Act of 1972 (CZMA), while specifically excluding Federal lands from the coastal zone, requires that a Federal agency's activities be consistent with the enforceable standards of a state's coastal management program to the maximum extent practicable when the agency's activities affect the coastal zone.

The enforceable standards for timber harvest activities are found in the State Forest Practices Act. The standards and guidelines for timber management activities in the Crystal Creek project area meet or exceed the standards in the State Forest Practices Act.

The Alaska Division of Governmental Coordination did a preliminary consistency review of our determination for the Draft EIS. The State concurred with the Forest Service determination of consistency, providing that the alternative measure of including temporary bridges at designated crossings is implemented. The recommendations from this review have been included in the Selected Alternative. I have determined that the proposed activities are consistent with the Alaska Coastal Management Program to the maximum extent practicable.

### *Executive Orders*

**EO 11988** - Executive Order 11988 directs Federal agencies to take action to avoid, to the extent possible, the long and short-term adverse impacts associated with the occupancy and modification of floodplains. The numerous streams in the Crystal Creek project area make it impossible to avoid all floodplains during timber harvest and road construction. The design of the proposed developments and the application of Best Management Practices combine to minimize adverse impacts on the floodplains.

**EO 11990** - Executive Order 11990 requires Federal agencies to avoid, to the extent possible, the long and short-term adverse impacts associated with the destruction or modification of wetlands. Soil moisture regimes and vegetation on some wetlands may be altered in some harvest units; however, the affected wetlands will meet wetland classification and will still function as wetlands in the ecosystem.

Because wetlands are so extensive in the project area, it is not feasible to avoid all wetland areas. However, wetlands are avoided whenever practicable. Road construction may result in the filling of wetlands and creates a permanent loss of wetland habitat. Effects will be minimized by not using wetlands as sites for overburden disposal. Implementation of BMPs, use of temporary bridges, and providing adequate cross drainage will also help minimize the area affected.

**EO 12962** - Executive Order 12962 directs Federal agencies to conserve, restore and enhance aquatic systems to provide for increased recreational fishing opportunities nationwide. Section 1 of the Executive Order is most pertinent to the proposed activity. Section 1 directs Federal agencies to evaluate effects on aquatic ecosystems and recreational fisheries, develop and encourage partnerships, promote restoration, provide access, and promote awareness of opportunities for recreational fishery resources.

Under the Selected Alternative, road closures would only provide access for recreational fishing opportunities to those willing to walk into the project area. The proposed shelter and access trail would enhance the recreational fishing at Ess Lake. Since most recreational fishing is expected to remain in saltwater, the impact of improved access on recreational fishing opportunities is expected to be minor.



**EO 12898** - Executive Order 12898 directs Federal agencies to identify and address the issue of environmental justice, i.e. adverse human health and environmental effects of agency programs that disproportionately impact minority and low income populations. Public scoping and analysis in the Subsistence section of the FEIS contribute to satisfy meeting this Executive Order.

### ***Federal and State Permits***

Federal and State permits necessary to implement the authorized activities will be obtained prior to implementation.

## **Implementation Process**

Implementation of this decision may occur no sooner than 30 days after the date of publication of the Notice of Availability of the Final EIS in the Federal Register, or 50 days following publication of the legal notice of the decision in the *Petersburg Pilot*, published in Petersburg, Alaska, whichever is later. Portions of the timber volume are currently planned to be offered in 1999 and in 2003.

This project will be implemented in accordance with Forest Service Manual and Handbook direction for Timber Sale Project Implementation in FSM 2431.3 and R10 FSH 2409.24. This direction provides a bridge between project planning and implementation and will ensure execution of the actions, environmental standards, and mitigation approved by this decision, and compliance with TTRA and other laws. All Best Management Practices (BMPs) are applied to the Selected Alternative. Implementation of all activities authorized by this Record of Decision will be monitored to ensure that they are carried out as planned and described in the Final EIS.

Appendix A of the Final EIS contains harvest unit design and road design cards. These cards are an integral part of this decision and document the specific resource concerns, management objectives, and mitigation measures to govern the layout of the harvest units and construction of roads. These cards will be used during implementation to assure that all aspects of the project are within applicable standards and guidelines and that resource impacts will not be greater than those described in the Final EIS. Unit cards will be updated to document any changes to the planned layout after the actual layout and harvest of the units occurs with project implementation.

The implementation record for this project will display each harvest unit, road, transportation facility, and other project components as actually implemented. Any proposed changes to the design, location, standards and guidelines, or other mitigation measures for the project, and the decisions on the proposed changes will be documented.

### ***Procedure for Changes During Implementation***

Proposed changes to the authorized project actions will be subject to the requirements of the National Environmental Policy Act (NEPA), the National Forest Management Act of 1976 (NFMA), Section 810 of the Alaska National Interest Lands Conservation Act (ANILCA), the



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Tongass Timber Reform Act (TTRA), the Coastal Zone Management Act (CZMA), and other laws concerning such changes.

In determining whether and what kind of NEPA action is required, the Deciding Official will consider the criteria for whether to supplement an existing Environmental Impact Statement (EIS) in 40 CFR 1502.9(c), and FSH 1909.15, sec. 18, and in particular, whether the proposed change is a substantial change to the Selected Alternative as planned and already approved, and whether the change is relevant to environmental concerns. Connected or interrelated proposed changes regarding particular areas of specific activities will be considered together in making this determination. The cumulative impacts of these changes will also be considered.

The intent of field verification is to confirm inventory data and to determine the feasibility and general design and location of a unit or road, not to locate final boundaries or road locations. Minor changes are expected during implementation to better meet on-site resource management and protection objectives. Minor adjustments to unit boundaries are likely during final layout for the purpose of improving logging system efficiency. This will usually mean adjusting the boundary to coincide with logical logging setting boundaries. Many of these minor changes will not present sufficient potential impacts to require any specific documentation or other action to comply with applicable laws. Some minor changes may still require appropriate analysis and documentation to comply with FSH 1909.15, sec. 18.

## Right to Appeal

This decision is subject to administrative appeal. Organizations or members of the general public may appeal this decision according to Title 36 Code of Federal Regulations (CFR) 215. The appeal must be filed within 45 days of the date that legal notification of this decision is published in the *Petersburg Pilot*, the official newspaper of record.

The Notice of Appeal must be filed with:

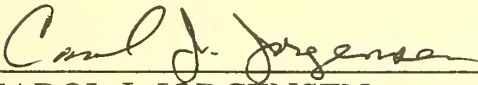
Regional Forester  
Forest Service  
U.S. Department of Agriculture  
PO Box 21628  
Juneau, AK 99802-1628

## Record of Decision

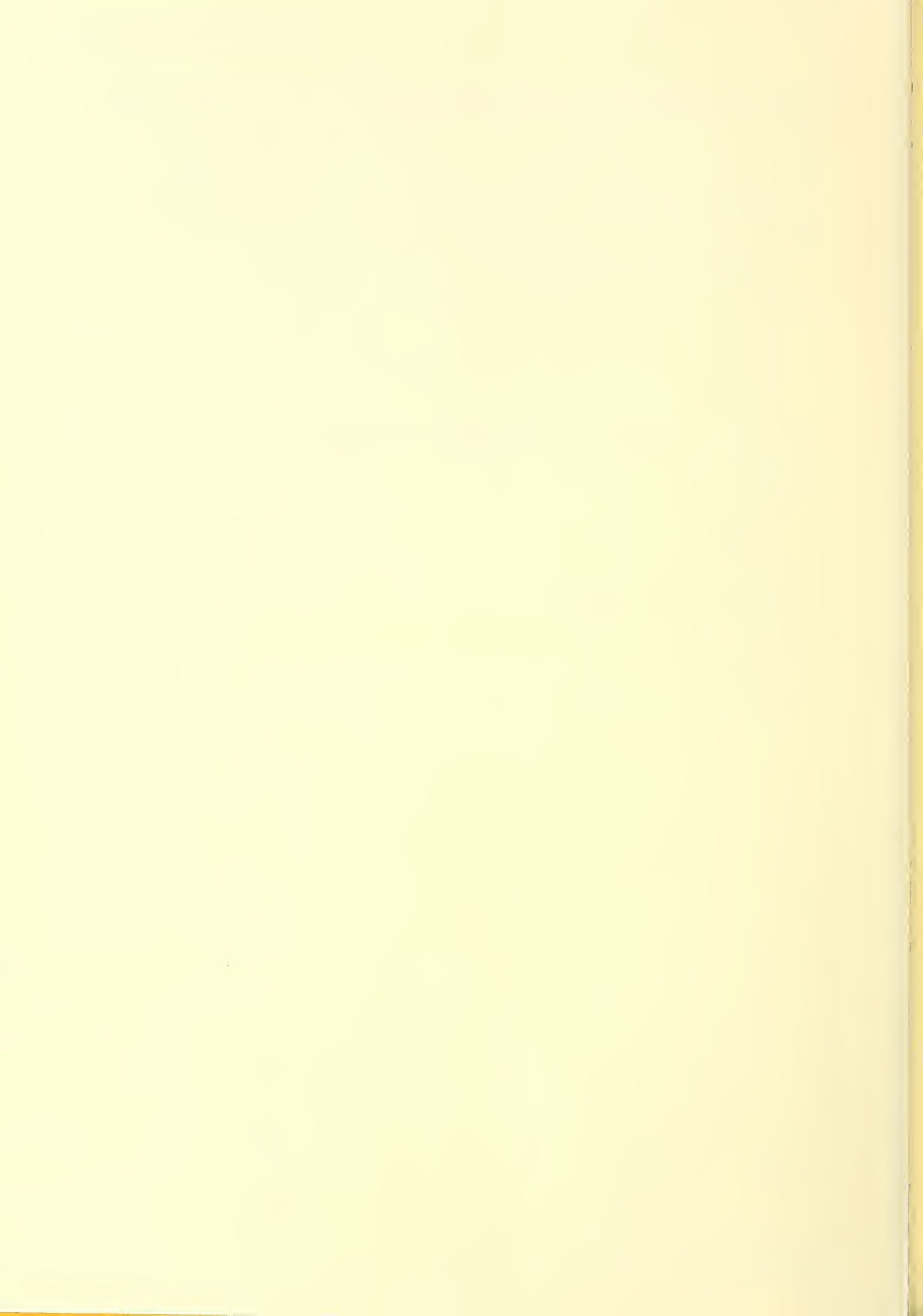
It is the responsibility of those who appeal a decision to provide the Regional Forester sufficient written evidence and rationale to show why the decision by the Assistant Forest Supervisor should be changed or reversed. This written Notice of Appeal must:

1. State that the document is a Notice of Appeal filed pursuant to 36 CFR Part 215;
2. List the name, address, and, if possible, the telephone number of the appellant;
3. Identify the decision document by title and subject, date of the decision, and name and title of the Responsible Official;
4. Identify the specific change(s) in the decision that the appellant seeks or portion of the decision to which the appellant objects;
5. State how the Responsible Official's decision fails to consider comments previously provided, either before or during the comment period specified in 36 CFR 215.6 and, if applicable, how the appellant believes the decision violates law, regulation or policy.

For additional information concerning this decision, contact Bruce Sims, Forest Service Interdisciplinary Team Leader, Stikine Area, P.O. Box 309, Petersburg, AK 99833, or call (907) 772-3841.

  
\_\_\_\_\_  
CAROL J. JORGENSEN  
Assistant Forest Supervisor

10 - 21 - 98  
Date





## Appendices

**APPENDIX 1 - ROAD 44921, SELECTED ALTERNATIVE.....R-27**

**APPENDIX 2 - SMALL OLD-GROWTH HABITAT RESERVE ADJUSTMENTS IN VCUS  
487 AND 489 NON-SIGNIFICANT FOREST PLAN AMENDMENT .....R-29**



## Appendix 1 - Road 44921, Selected Alternative

|  |                                      |  |
|--|--------------------------------------|--|
| <b>Road Number:</b> 44921                          | <b>Road Name:</b> Clear Creek        |  |
| <b>Termini:</b> Road 44920 to Section 86           |                                      | <b>Entry Cycle:</b> Intermittent       |
| <b>Length (miles):</b> 0.87                        | <b>VCU:</b> 487                      |  |
| <b>Functional Class/Travel Class:</b><br>Local / 7 |                                      | <b>Width (ft):</b> 14                  |
|  | <b>Design Vehicle:</b> Logging Truck |  |
| <b>Service Life:</b> Long Term                     |                                      | <b>Critical Vehicle:</b> Logging Truck |
| <b>Traffic Service Level:</b> D                    | <b>Highway Safety Act:</b> No        |  |
| <b>Maintenance Levels</b> -----                    | <b>Operational:</b> 2                | <b>Objective:</b> Storage              |

**Intended Purpose:** This road provides forest management access. It will not be needed for timber management within ten years and will be placed in storage after proposed use is completed.

### Travelway Management Prescription

This road will be designed as a single lane with some turnouts. The surface is maintained to protect the environment and economic investment.

The maintenance for this road will be storage: Remove or by-pass all drainage structures to restore natural drainage patterns, add waterbars as needed to control runoff, re-vegetate.

### Travelway Management Strategies

|                    |   |
|--------------------|---|
| <b>Encourage:</b>  | Non-motorized vehicles - bicycles, hikers |
| <b>Accept:</b>     | N/A                                       |
| <b>Discourage:</b> | N/A                                       |
| <b>Prohibit:</b>   | Public traffic during commercial use      |
| <b>Eliminate:</b>  | All motorized vehicles                    |



## RESOURCE CONDITIONS AND MITIGATIONS ROAD: 44921

### Watershed/Fisheries:

There is one Class II stream at approximately Milepost 0.56 that feeds directly into a Class I stream. Road construction sediment is a concern.

No timing restrictions.

### Wildlife Biodiversity:

There is a concern about new road access causing increased vulnerability to mountain goats and wolves. All roads will be closed to public motorized vehicular travel during and after logging.

### Rock Borrow Sites:

A rock source is available at milepost 0.40.

### Major Stream Crossings:

|                 |                  |
|-----------------|------------------|
| Mile Post       | 0.56             |
| Stream Class    | II               |
| Structure       | 20' Bridge       |
| Stream Width    | 10'              |
| Stream Depth    | 2'               |
| Substrate       | Gravel & Cobbles |
| Bank Height     | 4'               |
| Fish Habitat    | Rearing/Spawning |
| Stream Gradient | 3%               |

## **Appendix 2 - Small Old-growth Habitat Reserve Adjustments in VCUs 487 and 489 Non-significant Forest Plan Amendment**

Based on the project level analysis as described in the Old-growth Habitat Management Prescription and Appendix K of the Tongass National Forest Land and Resource Management Plan (1997), three small Old-growth Habitat reserves located in VCUs 487 and 489 have been adjusted to better provide size, location and habitat composition in the VCU. Specifically, the Delta Creek small Old-growth Habitat reserve, in VCU 487, as mapped in the Forest Plan, lacked sufficient acreage to meet the Appendix K criteria. The two small Old-growth Habitat reserves in VCU 489 (Point Agassiz and Brown Cove), as mapped in the Forest Plan, meet the criteria for both total acreage and productive old-growth but the location and habitat composition is improved with this adjustment.

The Secretary of Agriculture's implementing regulation indicates the determination of significance is to be "[b]ased on an analysis of the objectives, guidelines, and other contents of the forest plan" (36 CFR 219.10(f)). The Forest Service has issued guidance for what constitutes a "significant amendment" under the National Forest Management Act (NFMA). This guidance, in Forest Service Handbook (FSH) 1909.12, Chapter 5.32, identifies four factors to be used in determining whether a proposed change to a Forest Plan is significant or not significant. These four factors are: timing; location and size; goals, objectives, and outputs; and management prescriptions. The Alaska Region issued a Supplement to FSH 1909.12, Chapter 5.32, effective October 17, 1990 that includes an additional factor that can be considered in determining the significance of a Forest Plan Amendment. This additional factor deals with technical changes. An analysis of the factors is presented below.

### ***Timing***

The timing factor takes into account when, during the life of the Forest Plan, the proposed change is to take place. Generally, the later the change in the life of the Plan, the less likely it is to be significant.

The Forest Plan revision was completed in 1997, so this change is proposed for early in the life of the Plan. However, the Old-growth Habitat Management Prescription in the Forest Plan recognizes the small mapped reserves have received differing levels of field review and integration of site-specific information in their design. The intent of the Forest Plan was for project level environmental analysis, for project areas that include or are adjacent to mapped old-growth habitat reserves, to evaluate the size, spacing and habitat composition of mapped reserves. Additionally, Forest Plan Appendix K gives specific instruction for how to make these changes. Clearly, modifications to the Old-growth Habitat Land Use Designation (LUD) were anticipated in the Forest Plan. For these reasons, I have determined that these proposed changes relevant to timing are not considered significant.

## *Location and Size*

This factor takes into account the location and size of the area involved in the change, and the affected area's relationship to the overall planning area. Generally, the smaller the area affected, the less likely the change is to be a significant change in the Forest Plan.

The areas added to the small reserves were taken from Scenic Viewshed and Modified Landscape LUDs adjacent to the existing Old-growth Habitat reserve. The areas removed from the Old-growth Habitat LUD will change to Scenic Viewshed or Modified Landscape LUDs. The net change in total acres for the project area is an increase of 520 acres for the Old-growth Habitat LUD, which is not considered significant with respect to the size of the overall planning area within the Tongass National Forest.

The boundaries of the Old-growth Habitat reserves were modified to better address the Forest Plan objectives for biodiversity and to improve connectivity between the medium Old-growth Habitat reserves north and south of the project area and other natural setting LUDs. The Delta Creek Old-growth Habitat reserve in VCU 487 was modified to eliminate second-growth units, add high-value mountain goat winter range, and connect to the Patterson River Glacier Special Interest Area (a non-development Land Use Designation). The Point Agassiz Old-growth Habitat reserve was modified to include some of the highest volume old-growth stands, connect to the Muddy River drainage and riparian buffers, and eliminate low volume fragmented stands in the northwest part of Point Agassiz Peninsula. The Brown Cove Old-growth Habitat reserve was modified to include more mountain goat winter habitat and provide more connectivity to a medium Old-growth Habitat reserve (part of the Stikine-LeConte Wilderness). The knoll west of Brown Cove was deleted because it lacked old-growth connectivity to the rest of the Old-growth Habitat reserve .

## *Goals, Objectives, and Outputs*

This factor examines whether the change alters long-term relationships between the levels of goods and services projected by the Forest Plan. In most cases, changes in outputs are not likely to be a significant change in the Forest Plan unless the change would forego the opportunity to achieve an output in later years.

Goals - The Forest Plan goal for Biodiversity is to maintain healthy forest ecosystems; maintain a mix of habitats at different spatial scales (i.e. site, watershed, island, province and forest) capable of supporting the full range of naturally occurring flora, fauna, and ecological processes native to Southeast Alaska. The adjustment to these three reserves is consistent with the goals of the Forest Plan.

Objectives - The Forest Plan Objectives to maintain a Forest-wide system of old growth forest habitat (includes reserves, non-development LUDs, and beach, estuary and riparian corridors) to sustain old-growth associated species and resources; and, to ensure that the reserve system meets the minimum size, spacing and composition criteria described in Appendix K of the Forest Plan. The adjustment to these three reserves were specifically designed to meet the Forest Plan Objectives.



Outputs - Adjustment of these three reserves will have a relatively minor effect on the Forest Plan outputs on a Forest-wide basis, primarily because the change in the acres of LUDs that allow scheduled timber harvest is relatively small. There was a net reduction of 671 acres of tentatively suitable Forest lands, equating to a conservative estimate of a net reduction of 13.4 MMBF of available timber.

## *Management Prescriptions*

This factor accounts for whether the change in a management prescription is only for a specific situation or whether it would apply to future decisions throughout the planning area. Evaluate how the change alters the desired future condition of the land and resources or the anticipated goods and services to be produced.

None of the standards and guidelines associated with the Management Prescriptions have been changed as a result of this amendment. The changes to the three mapped small Old-growth Habitat reserves apply only in this specific situation. These changes also would apply in future management, however this action does not preclude future modifications being made so long as the standards and guidelines for the management prescription are achieved. The proposed amendment fulfills the desired future condition for Old-growth Habitat LUD Management Prescription as defined in the Forest Plan and would not significantly affect the goods and services produced.

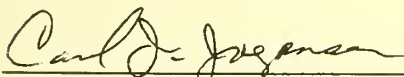
## *Technical Changes*

Technical changes to a Plan's management direction may be made on the basis of new information about the actual resource characteristics of the area. This category does not apply to this case.

## *Conclusion*

Based on a consideration of the factors above, I conclude adoption of this amendment is not significant in a NFMA context. This amendment is fully consistent with current Forest Plan goals and objectives. The amendment provides added detail on implementation of the Old-growth Habitat Management Prescriptions of the Forest Plan.

I hereby amend the Forest Plan with this non-significant amendment by adjusting the Delta Creek, Point Agassiz, and Brown Cove small Old-growth Habitat reserves as shown on the Record of Decision Map and documented in the project record for the Crystal Creek Timber Harvest Final EIS (see Figure R-2).



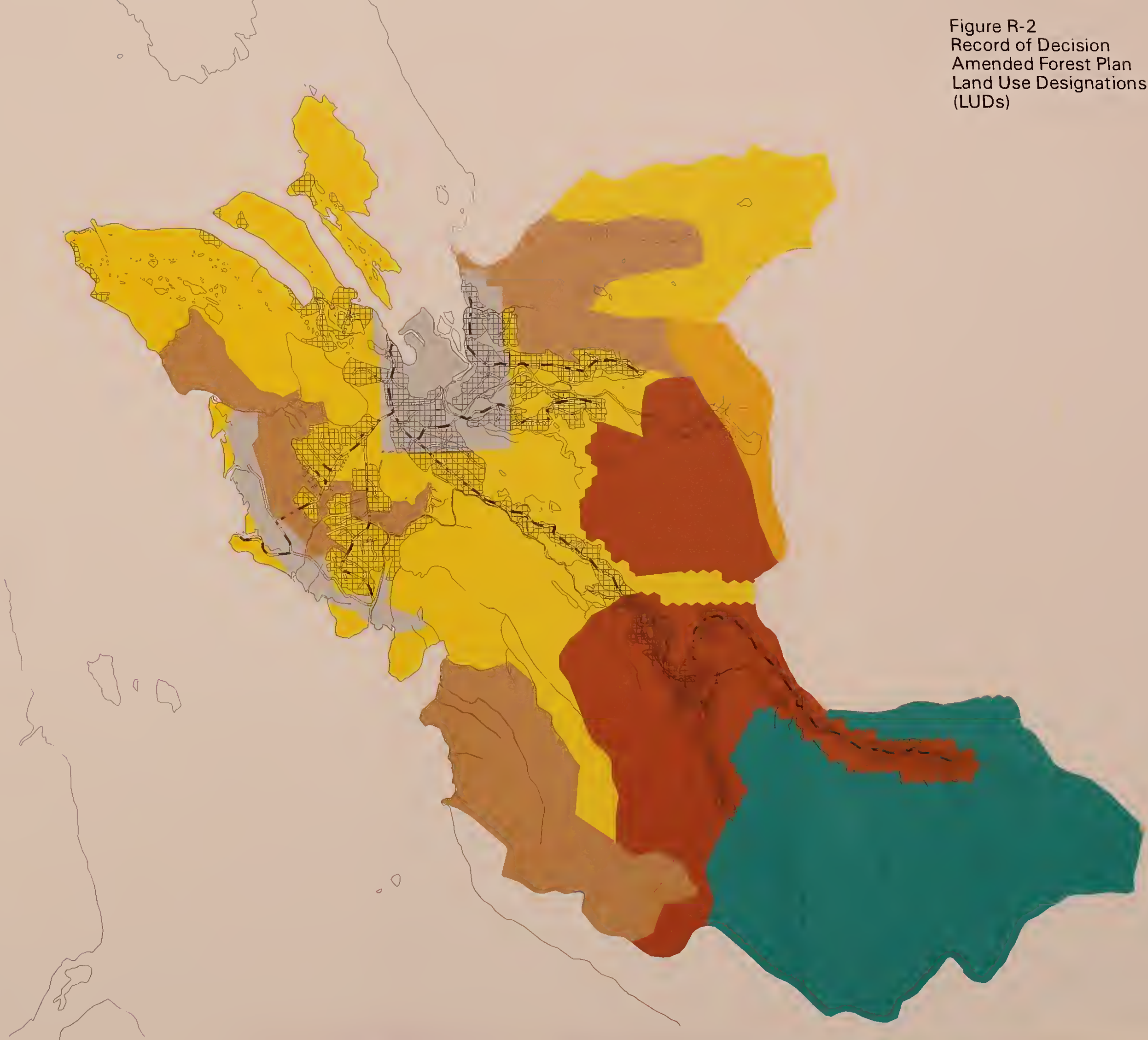
CAROL J. JORGENSEN  
Assistant Forest Supervisor

10 - 21 - 98  
Date



Figure R-2  
Record of Decision  
Amended Forest Plan  
Land Use Designations  
(LUDs)

- Legend**
- Old-Growth Habitat LUD
  - Special Interest Area (SIA) LUD
  - Modified Landscape LUD
  - Scenic Viewshed LUD
  - Timber Production LUD
  - Non-National Forest Lands
  - Existing Permanent Roads
  - Existing Closed Roads
  - Class I & II Streams, Lakes
  - Existing Managed Stands



0 7920 15840  
Scale is 1 inch = 7920 feet



map: /gis/projects/crystal/plots/feisplots/altrod.map 10/20/98  
macros: feismap.aml, altrod.aml





United States  
Department of  
Agriculture

Forest Service

Tongass  
National  
Forest  
R10-MB-364

October 1998



# Crystal Creek Timber Harvest

## Final Environmental Impact Statement







# **Crystal Creek Timber Harvest**

## **Final Environmental Impact Statement**

### **Tongass National Forest - Stikine Area USDA Forest Service Alaska Region**

|                                     |  |
|-------------------------------------|--|
| Lead Agency:                        | Tongass National Forest, Stikine Area<br>PO Box 309<br>Petersburg, Alaska 99833  |
| Responsible Official:               | Carol J. Jorgensen, Assistant Forest Supervisor<br>Tongass National Forest, Stikine Area   |
| For Further Information<br>Contact: | Bruce Sims<br>Tongass National Forest, Stikine Area<br>PO Box 309<br>Petersburg, Alaska 99833<br>(907) 772-3841  |
| Abstract:                           | The Stikine Area of the Tongass National Forest proposes to make sawtimber and utility volume available for harvest within the Crystal Creek Project Area using a variety of silvicultural prescriptions. This project would include necessary road construction for the transport of timber. The existing log transfer facility would be reconstructed at Thomas Bay. |



# Summary

This Environmental Impact Statement (EIS) was prepared by the Stikine Area of the Tongass National Forest to document the effects of, and alternatives to, a proposed timber harvest in two Value Comparison Units (VCU). VCU 487 (Patterson River) and VCU 489 (Muddy River) are on the mainland about ten miles northeast of Petersburg, Alaska. In this document we describe the “proposed action” and three alternative strategies for harvesting timber and associated activities in the Crystal Creek Project Area. A “no action” alternative is also described.

**Chapter 1, Purpose and Need:** provides the purpose and need for the project, the public issues surrounding the proposed action, and other information. The purpose and need for the proposed action is to implement the 1997 Tongass Land and Resource Management Plan (Forest Plan) by making sawtimber and utility volume available to the timber industry as part of the Stikine Area timber program. Five significant issues were determined by public comment and interdisciplinary team review:

- Timber Management and Economics,
- Moose Management,
- Biodiversity,
- Recreation, and
- Transportation.

**Chapter 2, Alternatives:** discusses the alternatives:

- The No Action Alternative (Alternative 1) proposes no additional commercial timber harvest or road construction at this time. Management activities, such as second-growth management, road maintenance, and fire-use timber will remain at current levels.
- The Proposed Action (Alternative 2) is designed to maintain a level of harvest that sustains a balance between high production forage and moose winter habitat.
- Alternative 3 focuses the timber harvest within the Timber Production and Modified Landscape Land Use Designations.
- Alternative 5 builds the least amount of road while meeting the timber harvest objectives to minimize resource concerns.
- Alternative 6 is designed to address comments on the Draft Environmental Impact Statement.

Alternative 6 is the Interdisciplinary Team preferred alternative, because it incorporated many of the comments regarding the Draft Environmental Impact Statement while meeting the Purpose and Need.

**Chapter 3, Affected Environment and Environmental Consequences:** describes the Project Area and predicts changes likely to occur with implementation of the alternatives. These changes include both direct, indirect, and cumulative impacts of the alternatives for each significant issue.

**Chapter 4, References and Lists:** contains the list of people that were sent copies of the Crystal Creek Timber Harvest Draft Environmental Impact Statement, the glossary including common acronyms, literature cited in this document, and a list of Interdisciplinary Team members.

**Appendix A, Activity Cards:** contains the Activity Cards for all the proposed units, roads, recreation, and watershed activities.

**Appendix B, Response to Draft Environmental Impact Statement Comments:** contains the comment letters on the Crystal Creek Draft Environmental Impact Statement and the Forest Service response to those comments.



Table S-1. Alternative Comparison

| Units of Measure   | Alt. 1   | Alt. 2       | Alt. 3       | Alt. 5       | Alt. 6       |
|--|----------|--------------|--------------|--------------|--------------|
| <b>Issue 1. Timber Management and Economics</b>  |          |              |              |              |              |
| Total volume harvested (MMBF)  | 0        | 15.1         | 16.4         | 11.8         | 14.2         |
| Harvested Acres by silvicultural prescription  |          |              |              |              |              |
| Clearcut with Reserve Trees-85% Removal  | 0        | 610          | 460          | 284          | 541          |
| Group Selection - 10% Removal  | 0        | 0            | 13           | 0            | 0            |
| Group Selection - 30% Removal  | 0        | 92           | 204          | 14           | 85           |
| Group Selection - 40% Removal  | 0        | 0            | 0            | 103          | 0            |
| Single Tree Selection - 20% Removal  | 0        | 3            | 3            | 75           | 28           |
| Single Tree Selection - 0%, 20%, 40%, 60% Removal  | 0        | 24           | 0            | 24           | 24           |
| <i>Total Proposed Harvested Acres</i>  | <i>0</i> | <i>729</i>   | <i>680</i>   | <i>500</i>   | <i>678</i>   |
| <i>Total Proposed Unit Acres</i>   | <i>0</i> | <i>1,015</i> | <i>1,285</i> | <i>1,050</i> | <i>1,046</i> |
| Opportunity for Small Sales (MMBF) <sup>1</sup>  | 0        | 1.9          | 0.1          | 7.5          | 2.3          |
| Relative Economic Ranking  | --       | 4            | 3            | 1            | 2            |
| <b>Issue 2. Moose Management</b>   |          |              |              |              |              |
| Percent Change in estimated moose habitat capability from present to year 2010 <sup>2</sup>  | -15%     | -11%         | -12%         | -12%         | -11%         |
| Percent of proposed high-forage openings compared to the optimum harvest rate suggested by the moose model (100 percent is optimum) <sup>3</sup> |          |              |              |              |              |
| West Muddy Moose Habitat Management Area <sup>4</sup>  | 0%       | 76%          | 0%           | 91%          | 61%          |
| East Muddy Moose Habitat Management Area   | 0%       | 68%          | 45%          | 14%          | 54%          |
| Patterson Moose Habitat Management Area  | 0%       | 106%         | 94%          | 73%          | 118%         |
| Upper Muddy Moose Habitat Management Area  | 0%       | 44%          | 265%         | 80%          | 44%          |
| <b>Issue 3 Biodiversity</b>  |          |              |              |              |              |
| Productive Old-Growth  |          |              |              |              |              |
| Acres of Productive Old-Growth Remaining after Harvest   | 24,600   | 23,898       | 23,923       | 24,199       | 23,974       |
| Percent of 1954 <sup>5</sup> Productive Old-Growth Remaining   | 83%      | 80.6%        | 80.7%        | 81.7%        | 80.9%        |
| Acres of Productive Old-growth in Old-growth Habitat reserves  | 5,490    | 6,320        | 7,530        | 6,320        | 6,380        |
| Acres of highest volume stands modified by project   | 0        | 114          | 11           | 546          | 191          |
| Percent of 1954 highest volume acreage modified by project   | 0.0%     | 1.4%         | 0.1%         | 7.0%         | 2.4%         |

<sup>1</sup> For this discussion, small sales are less than one million board feet (MMBF) with no permanent road building.

<sup>2</sup> Includes second growth management and created openings (Clearcuts With Reserves and Group Selection)

<sup>3</sup> A value much greater than 100% implies that it will be difficult to balance winter range and high-forage areas in the later stages of the timber harvest rotation within the Moose Habitat Management Area. A value much lower than 100% implies that the lack of high-forage habitat may soon limit moose numbers within the Moose Habitat Management Area without further logging or more intensified treatment of existing second growth.

<sup>4</sup> See the Moose Habitat Management Area Map (Figure 3-3) for the locations of the areas.

<sup>5</sup> 1954 is the date prior to commercial logging in the project area.

**Table S-1 Alternative Comparison (continued)**

| Units of Measure   | Alt. 1 | Alt. 2 | Alt. 3 | Alt. 5 | Alt. 6 |
|--|--------|--------|--------|--------|--------|
| Percent Change in the estimated deer habitat capability from Present (1998)  |        |        |        |        |        |
| By Year 2000   | 0%     | -1.1%  | -1.3%  | -0.8%  | -1.0%  |
| By Year 2010   | +1.4%  | +0.1%  | 0%     | +0.5%  | +0.2%  |
| By Year 2040   | 0%     | -1.7%  | -1.7%  | -1.1%  | -1.6%  |
| Percent Change in estimated marten habitat capability from Present to Year 2040  | -1%    | -2%    | -2%    | -2%    | -2%    |
| Percent Change in estimated brown creeper habitat capability from Present to Year 2040   | 0%     | -0.8%  | -0.6%  | -1.8%  | -0.4%  |
| Percent Change in estimated wolf habitat capability from Present to Year 2040  | 0%     | 0%     | 0%     | 0%     | 0%     |
| Estimated open road density (miles/square miles of project area) post-timber harvest <sup>6</sup> with road closures (miles/square mile) | 0.27   | 0.29   | 0.30   | 0.29   | 0.29   |
| Acres of proposed timber harvest in mountain goat winter range.  | 0      | 265    | 409    | 144    | 224    |
| Number of miles between the Horn Cliffs mountain goat hunting area <sup>7</sup> and closed roads after harvest                           | 1.75   | 0.6    | 0.6    | 1.75   | 0.8    |
| <b>Issue 4. Recreation</b>   |        |        |        |        |        |
| Construction of three-sided shelter and access trail at Ess Lake   | no     | yes    | no     | yes    | yes    |
| Number of acres that change from Semi-Primitive to Roaded Recreation Opportunity Spectrum (ROS) Class                                    | 0      | 5,130  | 4,690  | 1,550  | 3,650  |
| Number of harvested acres seen from Visual Priority Travel Routes and other use areas.   | 0      | 150    | 127    | 147    | 150    |
| <b>Issue 5 Transportation</b>  |        |        |        |        |        |
| Miles of permanent road construction   | 0      | 15.6   | 11.5   | 6.5    | 14.9   |
| Miles of temporary road construction   | 0      | 6.7    | 4.6    | 8.0    | 6.8    |
| Total miles of permanent road to be left open after harvest <sup>8</sup>   | 26.6   | 29.1   | 29.7   | 29.1   | 29.1   |
| <b>Other Environmental Considerations</b>  |        |        |        |        |        |
| <b>Subsistence</b>   |        |        |        |        |        |
| The estimated subsistence demand may likely exceed habitat capability (significant possibility of significant restriction)               | no     | no     | no     | no     | no     |
| Restrictions to existing access to subsistence resources are likely  | no     | no     | no     | no     | no     |
| Increased Competition between users for subsistence resources is likely to result in restrict to current harvest seasons and bag limits  | no     | no     | no     | no     | no     |
| <b>Hydrology</b>   |        |        |        |        |        |
| Percent of Planning Area in second-growth less than 30 years old   | 2.6 %  | 3.7 %  | 3.6 %  | 3.3 %  | 3.6 %  |

<sup>6</sup> Almost all new roads and 6.6 miles of currently opened temporary roads are proposed to be closed.

<sup>7</sup> The Horn Cliffs goat hunting area is estimated to be the habitat above 2000 feet elevation on the Horn Mountains Range.

<sup>8</sup> Includes existing roads and proposed roads.





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# **Chapter 1**

## **Purpose and Need**

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# Chapter 1

## Purpose and Need

### Introduction

The Crystal Creek Timber Harvest planning team integrated a variety of land management recommendations into this Final Environmental Impact Statement (FEIS). The team used their understanding of both ecosystem function and public use of the area to develop alternatives. Public comments on the Draft Environmental Impact Statement (DEIS) from individuals, cooperating agencies, timber industry, and environmental groups were received. Many of these comments were used to develop issues and were incorporated into the alternatives. As a result, several changes were made to alternatives proposed in the Draft Environmental Impact Statement (DEIS). Alternatives 2, 3, and 5 were modified. Alternative 4 was dropped from further consideration, and Alternative 6 was added.

The potential environmental, economic, and social effects of all alternatives were then evaluated. Timber, recreation, biodiversity, moose habitat, and transportation management needs were incorporated into the action alternatives. As a result, a variety of silvicultural prescriptions were used, boundaries of all three small Old-growth Habitat reserves within the planning area were adjusted, and an old-growth habitat connectivity corridor for wildlife was identified. A three-sided recreation shelter with a short access trail, wetland enhancement, road management needs, and thinning of existing second-growth are also included within the alternatives. The Crystal Creek EIS responds to the goals and objectives of the Forest Plan with an ecosystem management approach. The use of an ecosystem management approach is undertaken to sustain a diverse, healthy, and productive ecosystem.

### Proposed Action

The Stikine Area of the USDA Forest Service proposes to harvest approximately 16 million board feet of timber in the Crystal Creek project area, which is near Thomas Bay on the Southeast Alaska mainland. A variety of harvest methods and silvicultural prescriptions will be used. This project would include the necessary road construction for transport of timber. The existing log transfer site would be reconstructed at Thomas Bay.

### Purpose and Need

The purpose and need for this project is to make available for harvest approximately 16 million board feet of timber. This will:

1. Implement direction in the Tongass Land and Resource Management Plan,
2. Contribute to providing a sustained volume of wood to meet local and national demand, and
3. Provide local and regional employment opportunities.

There may also be opportunities to maintain or enhance forage for moose habitat to sustain a huntable population in the area. Activities such as commercial and pre-commercial thinning of second-growth stands, and geographically distributing timber harvest over time and habitat will be considered toward achieving this goal.

A variety of resources and values will be maintained through the application of ecosystem management principles in the design of the project.

# 1 Purpose and Need

A range of alternatives will respond to environmental and social issues. The no-action alternative will not harvest timber in the area. The Thomas Bay log transfer facility will be reconstructed and required roads will be constructed or reconstructed as needed.

## Decisions to be Made

The responsible official for this project is the Stikine Area Assistant Forest Supervisor, Tongass National Forest. The management decisions to be made encompasses the following:

- ♦ whether or not timber volume should be made available for harvest, and if so, how much;
- ♦ the location and design of the harvest units;
- ♦ location and design of road construction and reconstruction;
- ♦ mitigation and monitoring measures associated with timber harvest;
- ♦ what balance will be achieved between forage and winter habitat for moose;
- ♦ whether or not to provide increased recreational developments;
- ♦ whether or not to enhance wetlands along the Muddy River Road (Road 6256);
- ♦ where to do second-growth management (thinning and pruning) to create forage and enhance timber growth and value; and
- ♦ whether or not changes are needed in size and/or location of the small Old-growth Habitat reserves identified in the Forest Plan.

## Location

The Crystal Creek Project Area is located on the mainland, about ten miles northeast of Petersburg, Alaska (Figure 1-1). The project area contains approximately 64,000 acres. It is located in Townships 56, 57, 58 South; Ranges 79, 80, 81, 82 East, Copper River Meridian.

The project area includes the Patterson River drainage (VCU 487) and the Muddy River drainage (VCU 489), Point Agassiz Peninsula, Bock Bight Peninsula, Ruth Island, and the Brown Cove/Icy Cove Area. Crystal Creek is a tributary of the Muddy River. The Stikine-LeConte Wilderness Area is to the south of the project area.

## Project Implementation Scheduling

### Timber Sales

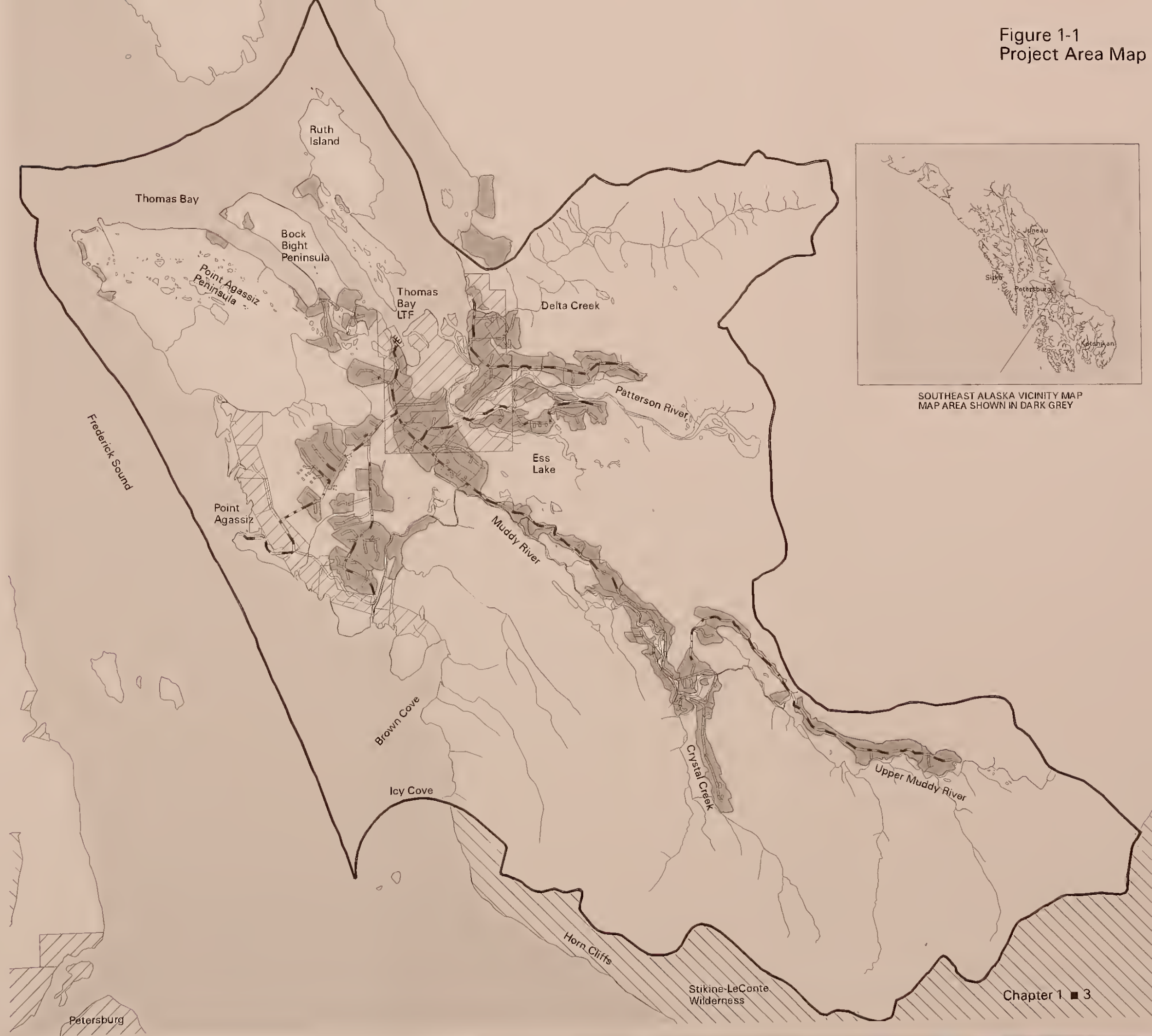
The Crystal Creek project was added to the ten-year timber sale schedule in 1992 in accordance with direction to review and update the schedule as needed. Scheduling in advance is needed in order to complete the field reconnaissance, environmental analysis, and on-the-ground layout prior to the timber sale appraisal. The identification of projects is based on prospective public issues, management concerns, and resource opportunities.

Timber harvest from this project was planned to be sold in 1999 with a volume of approximately 16 MMBF. The volume of 16 MMBF was based on available data estimating the tentatively suitable acres available for harvest, location and time of previous harvest, and restraints from other resources. The current ten-year timber sale schedule plans two sales. One sale of nine million board feet is planned in the Crystal Creek area in 1999. The other sale in the Ess Lake area will be offered in 2003. Smaller sales (less than one MMBF) may be offered and are included on the ten year sale schedule as aggregate volume.

The ten-year sale schedule is updated annually and this information is subject to change. After the decision for this project has been made, the sale schedule will be adjusted to reflect the decision. The volume is planned to be part of the Small Business Administration (SBA) volume. Currently, Region 10 has a commitment with the SBA to provide 124 MMBF region-wide as set-aside small business sales. This amount of volume and the location of the volume is determined jointly by the Regional Forester and the SBA on an annual basis. Future commitments will be determined on an annual basis.

Figure 1-1  
Project Area Map

- Legend**
- Crystal Creek Project Area Boundary
  - Existing Permanent Roads
  - Existing Closed Roads
  - Shoreline, Lakes, Class I/II Streams
  - Existing Managed Stands
  - Saltwater
  - Wilderness
  - Non-National Forest Lands
  - Log Transfer Facility (LTF)



SOUTHEAST ALASKA VICINITY MAP  
MAP AREA SHOWN IN DARK GREY

0 7920 15840  
Scale is 1 inch = 7920 feet



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macros: feismap.aml, base.aml





Other timber sale projects will occur in this area over time. The environmental analysis for the Forest Plan reflects the consideration of cumulative effects of past, present, and reasonably foreseeable future actions for the entire Tongass National Forest. For timber activities and timber associated activities, these effects and the effects on other resources, such as wildlife, were analyzed for 100 years. Site-specific projects are added to the ten-year timber sale schedule, as they become ripe for implementation. This ensures that the most recent scientific studies and adaptive management information can be used during the analysis.

The Muddy River Environmental Assessment was added to the schedule in 1997 to be offered in 2007. This project currently plans five MMBF of timber to be harvested. This amount was determined by the amount of tentatively suitable timber in the project area plus discussions about the availability of wildlife forage, small sale opportunities, and the effect on scenery. No proposed units have been identified and further analysis will be conducted. At that time; we will have completed some of our monitoring and some of the information needs identified in the Forest Plan will be completed.

#### **Recreation Shelter and Access Trail, Wetland Enhancement, Second-Growth Management, and Road Closures**

If the decision is made to do these projects, funding for them will be requested. The road closures and wetland enhancement projects may be completed through a cooperative agreement with the timber sale operator. The recreation shelter and access trail may be done through partnerships or a grant. Second-growth management is currently an annually funded project. No other projects have been identified for future analysis except the Patterson River trail. Opportunities for other projects may be identified during implementation and monitoring or suggested by the public. These suggested projects would have a separate environmental analysis done for them.

## **Management Direction and Desired Future Condition**

The Crystal Creek EIS is 'tiered' to the Tongass Land and Resource Management Plan (1997), and also to the Alaska Regional Guide (USDA Forest Service, 1983). General discussions from these documents and the administrative planning record are incorporated by reference rather than repeated in this EIS (40 CFR 1502.21).

The following documents provide the management direction used in developing the proposed action and alternatives.

### **Alaska Regional Guide, 1983**

The Alaska Regional Guide was used for initial guidance for management activities proposed by this analysis. Relevant portions of the Regional Guide as amended by the Forest Plan are incorporated by reference into this Environmental Impact Statement.

### **Tongass Land and Resource Management (Forest Plan, May 1997)**

Our analysis is guided by the Forest Plan which provides direction (land use designations, goals, objectives, management prescriptions, Standards and Guidelines) to achieve the desired future condition for the area. The Forest Plan allocates portions of the project area to five Land Use Designations (LUDs, Forest Plan Chapter 3): Timber Production, Modified Landscape, Scenic Viewshed, Old-growth Habitat, and Patterson Glacier Special Interest Area (Figure 1-2).

The Forest Plan designates the largest part of the area to Scenic Viewshed LUD (22,180 acres) which includes the Point Agassiz Peninsula, Patterson River area, Muddy River area,

# 1 Purpose and Need

and the coastline along Brown Cove and Icy Cove. The Crystal Creek drainage and upper Patterson River are designated Modified Landscape LUD (12,420 acres), and the upper Muddy River is classed as Timber Production LUD (13,960 acres). The Old-growth Habitat LUD includes 9,800 acres within three small Old-growth Habitat reserves. A small portion of the Patterson Glacier Special Interest Area (1,600 acres) is also within the project area. Three of these LUDs (Timber Production, Modified Landscape, and Scenic Viewshed) allow for timber harvest. There is a block of State land of approximately 2600 acres at the mouth of the Patterson River and about 1,110 acres of private land near Point Agassiz.

The Forest Plan Record of Decision (ROD) gives instructions for the transition to the new Forest Plan. Timber sale projects which were initiated before the Forest Plan ROD was signed, and which will be completed within the next few years, may be affected to varying degrees by the transition. The ROD describes four categories of timber sale projects, and their relationship to the Forest Plan. The Crystal Creek Timber Harvest project is identified under Category 3:

*"Timber sale projects now being planned, but for which a NEPA decision document will not be signed before the effective date of this Plan"* (Forest Plan ROD, 1997, page 41).

The ROD directed that Category 3 projects need to be consistent with applicable management direction in the Forest Plan except for new Standards and Guidelines for wildlife addressing landscape connectivity, endemic terrestrial mammals, northern goshawk, and marten management. The IDT was able to design all action alternatives to meet Forest Plan Standards and Guidelines without using the Category 3 exemptions. Discussions of direct, indirect and cumulative effects for these wildlife resources have been included in Chapter 3 of this document.

An interagency meeting for review of the consistency of the Crystal Creek Timber Harvest with the new Forest Plan was held in October, 1997. Agencies represented at the meeting included the U.S. Fish and Wildlife Service, Alaska Department of Fish and Game, National Marine Fisheries Service, U.S. Environmental Protection Agency, Alaska Department of Environmental Conservation, and Alaska Division of Governmental Coordination.

## Analysis Process

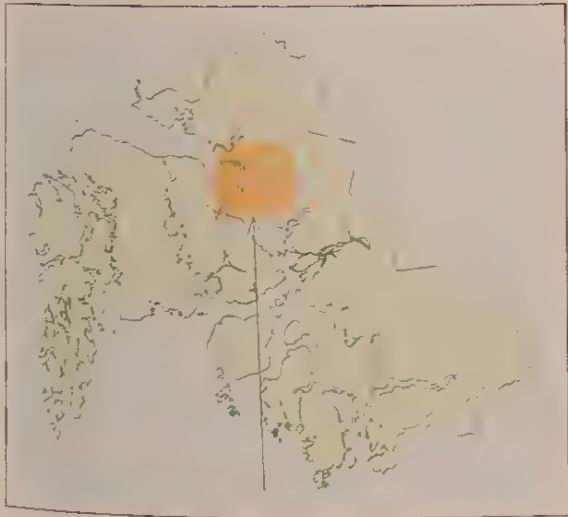
The analysis process is dictated by the National Environmental Policy Act (NEPA) and the regulations of the Council of Environmental Quality. This includes guidance for public involvement and for consultation with other agencies.

Pre-project analysis is conducted, including on-site inventory, evaluation of previous public comments, and review of prior environmental analyses. Public scoping is done and the results are used to develop issues and alternatives. These alternatives are presented in a Draft Environmental Impact Statement (DEIS) which is reviewed by the public. Comments on the DEIS are used to identify where more analysis is needed, and to modify or develop other alternatives for the Final Environmental Impact Statement (FEIS). The responsible official, the Assistant Forest Supervisor, uses the public comments and the environmental effects analysis to determine how the project will be implemented. This decision is documented in the Record of Decision (ROD) which is published as part of the FEIS.



Figure 1-2  
Forest Plan  
Land Use Designations (1997)

- Legend**
- Wilderness
  - Old-Growth Habitat
  - Semi-Remote Recreation
  - Special Interest Area (SIA)
  - Modified Landscape
  - Scenic Viewshed
  - Timber Production
  - Non-National Forest
  - Crystal Creek Project Area Boundary
  - Existing Permanent Roads
  - Existing Closed Roads
  - Shoreline, Lakes, Class I/II Streams
  - VCU Boundaries
  - Saltwater
  - Existing Managed Stands
  - Log Transfer Facility (LTF)



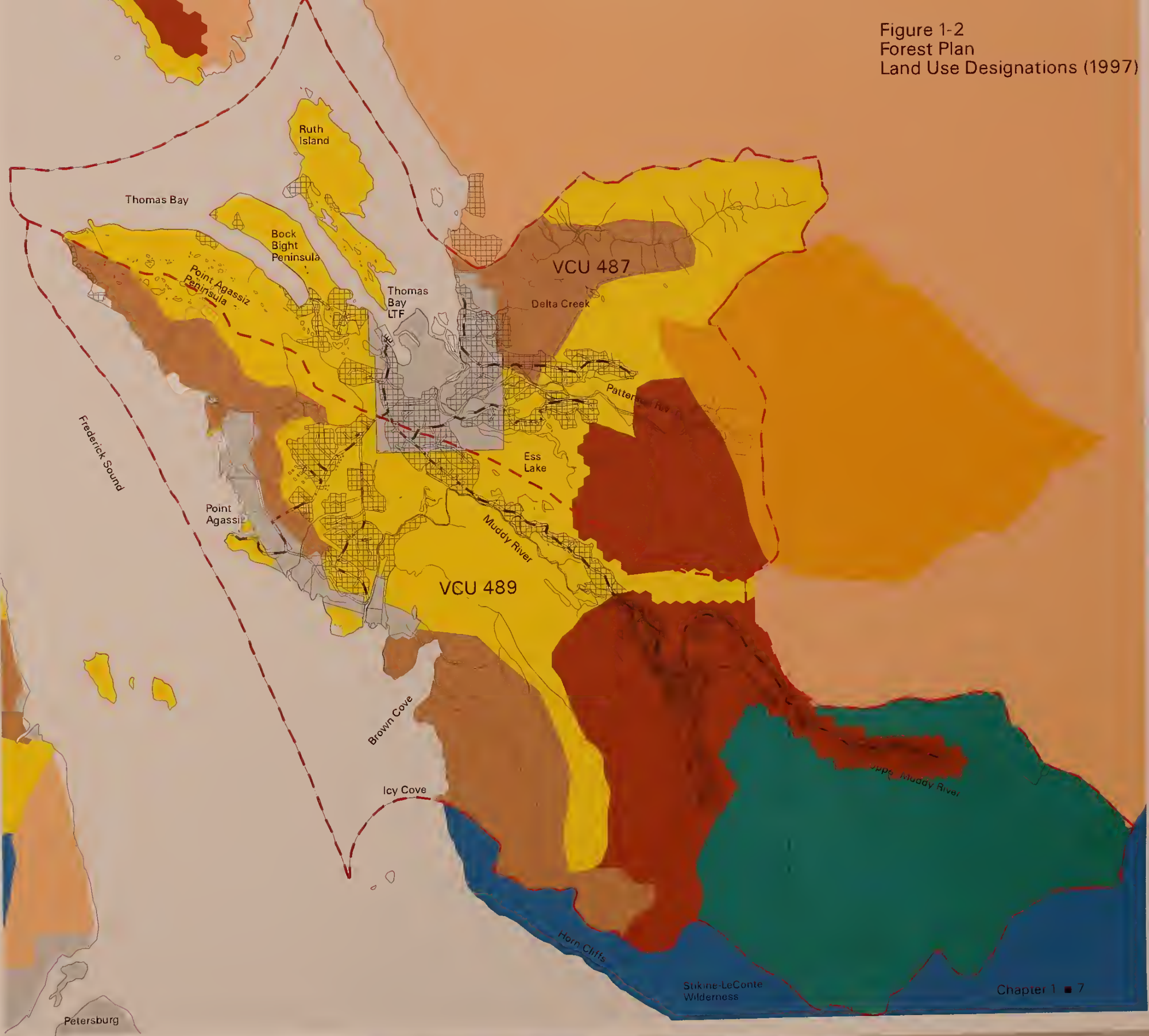
STIKINE AREA VICINITY MAP  
MAP AREA SHOWN IN ORANGE

0 7920 15840

Scale is 1 inch = 7920 feet



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## Public Involvement

The Crystal Creek Timber Harvest project first appeared on the *Stikine Area Project Schedule* in October 1996 (Volume 5, Issue 4). A scoping document was sent out in November 1996 to 86 people who requested to be on the mailing list, relevant State and Federal Agencies, and landowners within the project area.

Informal contacts were made with local residents, workers, and hunters at the Thomas Bay Administrative Site from September 14 to September 16, 1996 (the beginning of moose hunting season). Open houses were held in Petersburg and Kake in November 1996. These open houses included a slide presentation of the area. Another slide presentation was given at a Petersburg Fish and Game Advisory Board meeting. The slide presentation was also shown to representatives from Alaska Department of Fish and Game and U.S. Fish and Wildlife Service. A field trip was conducted to the project area with various members of State and Federal agencies. A Notice of Intent to prepare an environmental impact statement was published in the *Federal Register* on January 29, 1997 (Vol. 62, No. 19, p. 4245).

A presentation of the project was made to the Narrows Conservation Coalition in July, 1997. Following distribution of the DEIS, two open houses were held in November, 1997 to discuss the project, as well as other ongoing projects on the Petersburg Ranger District. These open houses were held in both Petersburg and Kake, Alaska.

## Significant Issues

A significant issue provides the focus for one or more alternatives and can be used to compare alternatives. It does not necessarily relate to the number of people who made the comment.

Some concerns can be mitigated the same way in all alternatives. For example, riparian and beach buffer strips will protect fish habitat from the effects of timber harvest in all alternatives. The analyses of these concerns are discussed under Other Environmental Considerations.

Comments were received from individuals, organizations, and other Federal and State agencies. We determined that the following five issues were significant and within the scope of the project. In formulating alternatives, we considered each of the significant issues and varied the way they were addressed in each alternative.

### Issue 1 - Timber Management and Economics

Timber harvest is permitted in most of the Crystal Creek Project Area in accordance with the Forest Plan.

**Issues** - What are the current economics of the timber harvest? What opportunities are there for sales to small operators? What are the opportunities for silvicultural methods other than clearcutting?

**Comments** - Many people requested that timber offerings be economically feasible. They would like timber offered from the project area to be made available to local small operators. A number of people supported the management of commercial second-growth timber, but some were concerned that old growth will be cut in order to make the management of second-growth profitable.

People have expressed an interest in not harvesting any more of the highest volume stands in the Thomas Bay/Point Agassiz area. The extensive use of alternative silvicultural methods (instead of traditional clearcutting) was recommended by many people.



# 1 Purpose and Need

**How these comments were incorporated into alternatives -** Single-tree selection and group selection were used where feasible to address resource concerns. Alternative 5 was designed to harvest much of the timber from the existing road system to provide more opportunities for small operators. Alternative 3 avoids harvest in the highest volume stands and harvests within the Timber Production LUD. Alternatives 2, 5, and 6 propose ground-based logging systems only, while Alternative 3 includes helicopter logging for about one-third of the volume. All alternatives recommend second-growth stands for pre-commercial thinning. No commercial thinning harvest was considered at this time, although opportunity may exist within the next 10-15 years as the trees grow to commercial size.

**Units of measure for this issue -**

- ♦ board feet of timber volume harvested
- ♦ number of acres harvested by silvicultural prescription
- ♦ opportunity for small sales

## Issue 2 - Moose Management

The Crystal Creek Project Area is an important moose hunting area. The moose population is believed to have increased after clearcutting occurred during the 1960s and 1970s (LeResche et. al. 1974, Doerr 1983) because shade intolerant plants used for forage by moose grew vigorously. Over time, as the trees in these clearcuts grow, the understory is gradually shaded out, and the quality of the moose habitat declines.

**Issue -** How can moose habitat be managed through time to provide a continuing supply of forage and winter habitat capable of sustaining a huntable moose population?

**Comments -** The public generally supported management of moose habitat but some did not want to see vegetation management done at the expense of other wildlife species. Some people asked whether clearcutting was really the best method to achieve forage production. The management of second-growth timber to provide forage areas was mentioned as an option.

**How these comments were incorporated into alternative development -** Alternative 2 was designed to implement a timber harvest strategy that would sustain the forage and winter habitat needs for moose through much of the project area. Other alternatives met the long-term habitat needs of moose to varying degrees.

**Units of measure -**

- ♦ percent change in estimated moose habitat capability (from present to 2010)
- ♦ percent of high-forage openings created by logging relative to the 20-year harvest rate suggested by the moose model by moose habitat management area

## Issue 3 - Biodiversity

Biological diversity is defined as the distribution and abundance of different plant and animal species and communities within the project area.

**Issue -** How will timber harvest affect the maintenance of old-growth forest habitats, the protection of the highest-volume timber stands, and old-growth associated wildlife species?

**Comments -** Viability for all species should be maintained. Habitat should be maintained for old-growth associated species. Old-growth Habitat reserves, as proposed by the Forest Plan, should be adjusted to include more high volume timber stands. Concern was expressed that increased access could lead to over hunting of the Horn Cliffs mountain goat population. The U. S. Fish and Wildlife Service had a concern about the effects of increased road density on wolves.

**How these comments were incorporated into alternative development -** The Interdisciplinary Team (IDT) proposed modifications to the Forest Plan Old-growth Habitat reserves to make the boundaries identifiable on the ground and to meet the Plan's criteria (Forest Plan, Appendix K). These adjustments are not expected to require a significant Forest Plan amendment (Forest Plan, 3-82). Alternative 3 incorporates the proposed modifications to the Old-growth Habitat reserves recommended by the U. S. Fish and Wildlife Service and the Alaska Department of Fish and Game to protect high volume stands in the Point Agassiz area. Alternative 6 modified the Old-growth Habitat reserve developed for Alternative 3 to provide some additional opportunities for timber harvest and management of existing second growth for timber production while still protecting high volume forests.

Clearcutting with reserve trees used within all action alternatives will retain about 15 percent of the forest to provide old-growth legacy in the stand. Where units have large amounts of unmerchantable trees more trees may be retained. This is more feasible where shovel or tractor yarding is used. Single-tree selection is used in high volume stands in the Point Agassiz area to maintain old-growth habitat. Group selection was proposed in areas designed to maintain stand structure and diversity. Generally, this prescription is used in units with uphill cable yarding.

A public motorized road closure during and following timber harvest operations is proposed at the crossing of Muddy River to the Crystal Creek drainage to help protect the Horn Cliffs mountain goat population and wolves. Access to this road would be further discouraged by a gate and by drainage structure removal. Alternative 6 reduces road construction and harvest units within the Crystal Creek Watershed when compared to Alternatives 2 and 3.

Most new road construction and all temporary road construction is proposed for closure after the sale. Approximately 6.6 miles of existing temporary road will be closed.

## Units of measure -

- ◆ number of productive old-growth acres maintained for the life of the project, maintained indefinitely, and modified by harvest
- ◆ number of animals that the habitat is capable of supporting for selected species over time
- ◆ miles of road per square mile to determine the effect on animals sensitive to hunting and trapping
- ◆ changes in access to the Horn Cliffs mountain goat population

## Issue 4 - Recreation

One of the major recreational uses is fall moose hunting. Other uses include: bicycling the existing road system, sightseeing, camping, and freshwater fishing.

**Issue -** How will the current recreation opportunities change with timber harvest and associated new roads, and should there be any new recreation developments?

**Comments -** Comments varied as to whether or not recreation opportunities should be increased. Some people were against more timber harvest and new roads and wanted primitive areas maintained with scenic values protected. People also commented that they would like to see improved recreation facilities and a broader range of recreation opportunities. Several moose hunters expressed a concern that increased trail access in the Patterson River area would lead to hunter congestion, potential safety issues, and restrictions on hunting near the trail. Other people thought that a trail would be an asset.

# 1 Purpose and Need

**How these comments were used in developing alternatives** - Scenic values are maintained from viewpoints in Thomas Bay, Patterson River, and Frederick Sound in all action alternatives. A three-sided shelter and access trail are proposed for Alternatives 2, 5, and 6. Trail opportunities in the Patterson River area were identified but not proposed at this time in any of the alternatives.

**Units of measure -**

- ♦ number of developed recreation opportunities
- ♦ number of acres that change in the Recreation Opportunity Spectrum (ROS) from Semi-Primitive to Roaded (USDA Recreation Opportunity Spectrum Manual)
- ♦ number of harvested acres that will be seen from visual priority travel routes and other use areas and the amount of impact on the landscape

## Issue 5 - Transportation

The Thomas Bay road system was constructed during the 1960s and 1970s for timber harvest. The road system is not connected to a full service community but does serve a gravel operation, recreationists, and a few households located at Point Agassiz. About half of the system is currently passable by high-clearance vehicles. Portions have been made impassable by the meandering Muddy River and closure by brush.

**Issue** - How will the proposed timber harvest influence the maintenance and extent of the road system?

**Comments** - Comments were received against building any new roads in the area. Others wanted existing roads and proposed roads maintained for public use. Some wanted to use the original LTF site, while others recommended that other sites be examined for an LTF. Concern about a possible conflict between the current gravel operation and the LTF was also noted. The possibility of using barges instead of towing rafts was mentioned. One person did not want roading across the northern portion of the Point Agassiz Peninsula because, in their opinion, it is a unique geologic formation.

**How these comments were used in developing alternatives** - The IDT developed Road Management Objectives (Appendix A) for all roads in the project area with the intent of maintaining the current level of use. Approximately 6.6 miles of existing temporary roads, which are not currently being used by the public, are planned for closure. A portion of Road 6256, that parallels the Muddy River, will be relocated in all action alternatives. Almost all new roads will be closed after harvest except for approximately 1.15 miles of Road 44900 and the relocated section of Road 6256. Roads into Crystal Creek drainage will be closed to public motorized use during and after harvest operations. Alternative 3 would construct new road along the Upper Muddy River. Alternative 5 does not build a road into the Crystal Creek drainage. The log transfer facility (LTF) is being redesigned to provide better docking for small boats and floatplane access in all action alternatives. The LTF design is shown in Appendix A.

**Units of measure -**

- ♦ number of miles of permanent and temporary road construction
- ♦ number of miles of permanent road to be left open after harvest

## Other Environmental Considerations

There were many concerns raised during the public scoping and analysis that are not being treated as significant issues because they are mitigated in the same way in all alternatives or are not significantly affected by any alternative. These are discussed briefly at the end of Chapter 3 after the discussion of the effects of the significant issues.



**Air quality** - No significant impact will occur by the implementation of this project to air quality within the project area. Minor amounts of particulate will be released with logging equipment exhaust and dust associated with logging operations.

**Soils, Hydrology, and Fisheries** - Mitigation measures including stream buffers will be used to prevent significant impact to the water quality and fisheries habitat (Forest Plan Chapter 4 and Appendix C). These mitigation measures include Tongass Timber Reform Act (TTRA) buffers, Forest Plan Riparian Management areas, beach fringe, construction timing restrictions, and limiting harvest on unstable soils.

**Heritage Resources** - A cultural resource survey was conducted and all sites will be avoided in accordance to law. The Programmatic Agreement (#95MOU-10-029) with the State Historic Preservation Officer was followed as part of the environmental analysis.

**Karst and Caves** - No karst or cave features were found in the project.

**Lands** - Increased traffic is expected during timber operations. Roads will be properly signed for safety considerations. Access to private lands will not change.

**Minerals** - There is no known conflict with any mineral operations or future development in the area.

**Subsistence** - There is no significant possibility of a significant restriction of subsistence resources as a result of this project.

**Threatened, Endangered, and Sensitive (TES) Animals and Plants** - No significant adverse impacts are expected to TES animals. No sensitive plants were found during surveys. A biological assessment found that no adverse impacts were likely to occur to Threatened and Endangered species and their critical habitat.

**Wetlands** - Impacts to wetlands will be minimized through road location and unit design (Forest Plan, pages 4-107 and 4-108).

## Comments Outside the Scope of This Project

Some comments received during scoping are not specific to this project or are part of decisions at a higher level. These comments are paraphrased and addressed below:

- ◆ The IDT should identify and evaluate potential consequences of the project which occur outside the project area boundaries, such as air and water quality at the Ketchikan pulp mill.

The Forest Service does not regulate the processing of products removed from the National Forest other than by requiring primary processing within the State of Alaska unless an export permit is obtained. Any wood processing plant which receives National Forest timber must comply with State and Federal regulations governing air and water quality.

- ◆ The Forest Service should develop and manage a centrally located log sort yard that makes harvested logs available to the local population.

The Forest Service does not normally sell harvested timber because it would be in direct competition with private timber operators. The project will make a sort yard site available for use by timber sale purchasers. People interested in buying logs could contact the purchaser.

# 1 Purpose and Need

- ◆ The Forest Service, Narrows Conservation Coalition, and the Southeast Alaska Conservation Council should host log home building workshop to encourage use of second-growth timber locally.

Although there is interest in such a workshop, it is not connected specifically to this project. This suggestion has been directed to our Rural Community Assistance Coordinator. A wood products workshop was held in Petersburg during October 1997, which reviewed various studies the U. S. Forest Service, Forest Products Laboratory in Madison, Wisconsin has conducted.

- ◆ Questions were raised regarding deer and moose pellet counts in the Thomas Bay partial harvest study area. A peer review by other biologists was suggested.

The study results are preliminary but have been distributed to other biologists in Southeast Alaska. Several field trips have been made to visit the site with biologists from other agencies. Heavy forage browsing was observed and pellet-groups were measured within the planning area. All the wildlife data cited in this EIS is available for public review.

The field data collected to date suggests that both deer and moose are making much greater use of the partial harvest area than the unlogged old growth. The EIS has taken a conservative analysis approach and assumed that limited selective logging will maintain winter habitat use, not double or triple use as suggested by the actual field data.

- ◆ Towing log rafts or barging logs may affect crabbing operations in Thomas Bay.

A commercial shipping lane is recognized in Thomas Bay from previous and current use of the Thomas Bay Log Transfer Facility (LTF) and the Forest Service is not recommending any changes to this shipping lane. Commercial fishing is not allowed to impede commercial shipping.

Currently, a barge with a 60 foot beam is used to transport sand and gravel from the Thomas Bay LTF. Similar width barges are used in Southeast Alaska for transporting logs. The turning radius of log barges would be similar to the gravel barges currently in use. Additional impacts may occur as a result of increased barge traffic.

Log rafts are generally 66 feet wide and will require a larger turning radius. Crab pots within 500 feet of the LTF or ones located within the turning radius of the log rafts at the southeast corner of Ruth Island may be affected. Any possible affect will be minimal since rafts will use a similar channel width as the current gravel operation.

- ◆ There was concern that the actual timber volume in the project area is less than Forest Plan estimates.

This was considered during the determination of the ASQ for the Forest Plan (Forest Plan FEIS, Appendix B) by the use of Model Implementation Reduction Factors.

- ◆ If the Forest Plan is adopted as proposed, a 16 MMBF timber harvest may not be feasible due to the drastic measures required for stream protection (i.e. buffers, riparian zones, windfirmness).

Standards and guidelines in the Forest Plan are incorporated into the timber volume projections.

- ◆ Ecosystem management requires an approach to planning that examines an area to determine what level of harvest the ecosystem can support without undue stress prior to setting a timber harvest target. As long as timber production targets drive the planning process, ecosystem management will be an elusive goal.

The volume for the proposed action was determined after a preliminary analysis of the area. Further analysis led to development of alternatives with different volumes proposed for harvest.

- ◆ Several respondents wanted more detailed information than was provided in the DEIS.

The IDT attempted to make a concise readable document as requested by the public and as required by 40 CFR 1502. More information is available in the planning record which can be viewed by contacting the Petersburg Ranger District. The planning record contains the documents, studies, papers, and any other supporting material for the statements in this EIS.

## Agency and Native Government Coordination

The Forest Service is responsible for coordinating the review of the project by several other agencies. The purpose of these reviews is to help make the best possible analysis. In some cases, the reviews are required because another agency has authority to issue permits for specific proposed activities. The Forest Service is committed to working closely with other agencies and tribal governments in order to foster collaborative stewardship.

In November 1996, scoping documents were sent to the Alaska Division of Governmental Coordination which is the clearing house for all State of Alaska agencies. In addition, scoping documents were sent directly to the Alaska Department of Fish and Game, Alaska Department of Environmental Conservation, and Alaska Department of Natural Resources. Federal agencies that received scoping documents included the U. S. Fish and Wildlife Service, National Marine Fisheries Service, and the Environmental Protection Agency. Comments were received from all the above agencies except the Alaska Department of Natural Resources and the National Marine Fisheries Service.

In order to foster collaborative stewardship and information sharing, in May 1997, these agencies were invited on a field review of the Crystal Creek Project Area. Representatives from the U. S. Fish and Wildlife Service, U. S. Army Corps of Engineers, Alaska Department of Fish and Game, and Alaska Department of Environmental Conservation participated in this review.

In October 1997, a meeting was held to review the Crystal Creek analysis to ensure compliance with the Forest Plan as described under Transition to the Revised Plan (Forest Plan ROD, pages 41 and 42). In attendance was an interagency implementation team consisting of personnel from the National Marine Fisheries Service, Environmental Protection Agency, Alaska Department of Fish and Game, Alaska Department of Environmental Conservation, and the Forest Service.

All agencies received copies of the DEIS. Comments were received from the U. S. Fish and Wildlife Service, U. S. Corps of Engineers, Alaska Department of Fish and Game, and Alaska Department of Environmental Conservation (Appendix B). A meeting with the U. S. Fish and Wildlife Service occurred after the comment period to establish collaborative Old-growth Habitat reserve boundaries.



# 1 Purpose and Need

The Organized Village of Kake, a Federally Recognized Tribal Government, has been contacted for this project. In October 1996, they were contacted to see what interest they had in the project. An open house, which included a slide show on archaeology and a questionnaire to generate discussion, was held in Kake in November 1996. The Petersburg Indian Association was contacted numerous times to inform them of the project. Open houses were held in Kake and Petersburg in November 1996, which included a poster and a questionnaire on archaeology.

## U.S. Army Corps of Engineers and Alaska Department of Environmental Conservation

The permit from the U.S. Army Corps of Engineers (COE) which covers the Thomas Bay Log Transfer Facility (LTF) incorporates requirements for the Clean Water Act. The Clean Water Act of 1972, as amended, directs all federal agencies to comply with all federal and State water quality regulations. It also includes U.S. Environmental Protection Agency (EPA) permits for pollution discharge elimination and spill prevention control and countermeasure. This permit covers the Alaska Department of Environmental Conservation (ADEC) Certificate of Reasonable Assurance for compliance with State water quality standards.

All roads, landings, and rock pits will be designed to the minimum standards needed for timber harvesting and other silvicultural activities. These will be constructed and/or reconstructed in accordance with BMPs listed in 33 CFR 323.4(a) (6). The COE will determine whether any permits are needed under Section 404 of the Clean Water Act.

A 1992 Memorandum of Agreement between the Alaska Department of Environmental Conservation and the Forest Service, Alaska Region outlines the Forest Service responsibilities with regard to the Clean Water Act.

## Alaska Division of Governmental Coordination and Other State Agencies

A review coordinated through the Alaska Division of Governmental Coordination (ADGC) will determine if the State agencies agree with the Forest Service's determination of consistency with the Alaska Coastal Management Program (ACMP). The State issued a provisional concurrence with the determination of consistency on December 26, 1997. A State tidelands easement (ADL 104778) for the use of the Thomas Bay Log Transfer Facility has also been obtained.

### Revised Forest Practices Act 1990

The Revised Forest Practices Act affects National Forest management through its relationship to the Alaska Coastal Management Program and the Federal Coastal Zone Management Act.

The Revised Forest Practices Act is the standard which must be used for evaluating timber harvest activities on Federal lands for purposes of determining consistency to the maximum extent practicable with the Alaska Coastal Management Program. The Act recognizes that consistency is attainable for timber harvest on federal land using procedures different from those required by the Act or its implementing regulations.

### Alaska Coastal Management Act of 1977

All alternatives will be in compliance with the federal Coastal Zone Management Act of 1972. This Act requires federal agencies to ensure that activities or developments are consistent with approved state coastal management programs to the maximum extent practicable. The Alaska Coastal Management Act of 1977 contains standards and criteria for a determination of consistency for activities within the coastal zone.

A Memorandum of Understanding between the State of Alaska and the Regional Forester, dated October 8, 1981, outlines standards against which the consistency evaluation will be

made. The following standards are included in the agreement:

- Alaska Statute Title 46, Water, Air, Energy, and Environmental Conservation;
- Alaska Forest Practices Act of 1990;
- the District Coastal Management Program, and
- Provisional Consistency was granted by Alaska Department of Governmental Coordination.

## **U.S. Fish and Wildlife Service and National Marine Fisheries Service**

Biological Assessments which assess the status and project impacts on Threatened and Endangered species have been reviewed by both agencies. The agencies concurred with the findings that no likely adverse impacts will occur.

## **U.S. Environmental Protection Agency**

The Environmental Protection Agency has reviewed and commented on the DEIS and discussed the project with the Interdisciplinary Team leader.

# 1 Purpose and Need



# **Chapter 2**

## **Alternatives**

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# Chapter 2

## Alternatives

This chapter summarizes the development of alternatives to meet the Purpose and Need as described in Chapter 1. The action alternatives designed for this project, as well as a no-action alternative, are discussed, compared, and evaluated. This chapter presents the following information:

- alternative development,
- alternatives considered but eliminated from detailed study,
- design elements common to all action alternatives,
- descriptions of alternatives,
- a summary comparison of alternatives presented in table format, and
- mitigation and monitoring measures.

### Alternative Development Process

A group of resource specialists, known as the Interdisciplinary Team (IDT), designed alternatives to provide different approaches to meet the purpose and need and that address issues raised in the scoping process. For example, one alternative emphasizes moose habitat management and another doesn't propose road construction in the Crystal Creek drainage. Consideration of alternatives also included identification of alternatives eliminated from detailed study.

When developing alternatives, the IDT used comments and concerns expressed by the public. These comments were consolidated into major issues. The IDT then developed strategies that could be used to address these issues. The IDT determined units of measure for comparing alternative effects.

For the Draft Environmental Impact Statement (DEIS), four action alternatives were designed to address and resolve issues of public concern. After the comment period on the DEIS, three alternatives were modified, one alternative was dropped and an additional alternative was created to address the public's concerns. Each alternative presented in the Final Environmental Impact Statement (FEIS) responds differently to the significant issues in Chapter 1. From these five alternatives, the Assistant Forest Supervisor will make a decision on which alternative to implement.

### Alternatives Considered but Eliminated from Detailed Study

Some alternatives were dropped early in the analysis process. One alternative evaluated in the DEIS was dropped from further consideration in the FEIS.



## 2 Alternatives

### Harvesting Timber in the Headwaters of the Muddy River

In order to harvest timber in the headwaters of the Muddy River, a high number of road miles would have to be constructed. There was no need to create forage for moose and deer since units harvested in the middle 1970's near the upper watershed are still providing forage.

### Harvesting Timber North of the Patterson River

Most of the available timber north of the Patterson River was harvested during the 1960s and 1970s. Not enough suitable timber remains to warrant reconstruction of the transportation system which may include construction of an LTF near Delta Creek. Future timber harvest should be feasible in this area, when the second-growth timber becomes large enough to harvest commercially.

### Harvesting Timber in the East Fork of Crystal Creek

Road construction and helicopter logging of the east fork of Crystal Creek drainage would be more cost-effective after road construction occurs with this entry. Once a road is constructed, harvest options may be possible in this area.

### Harvesting Timber in the Upper Patterson River

Road construction and helicopter logging of the upper Patterson River drainage would be more cost-effective after road construction occurs with this entry. Once a road is constructed, harvest options may be possible in this area.

### Harvesting Timber on Ruth Island, Bock Bight, and Point Agassiz Peninsulas

Ruth Island is currently classed within the Scenic Viewshed LUD and is highly visible from Thomas Bay and Frederick Sound. Future entries may harvest minor amounts of volume using a helicopter-logging system.

Although most of the Bock Bight and Point Agassiz Peninsulas are within Forest Plan LUDs classed as moderate development, much of the forested land is within beach fringe or riparian buffers. The remaining scattered low-volume stands interspersed with wetlands may never be harvested.

### DEIS Alternative 4 Use of Gap Phase Harvest

The Crystal Creek Draft EIS proposed use of cable yarding systems to harvest 10 percent of forest stands in openings less than  $\frac{3}{4}$  acre in size. Further analysis indicated this prescription is not practicable with cable yarding. The silvicultural prescription is suited for helicopter yarding and is proposed in Alternative 3.

### Narrows Conservation Coalition Proposal

See letter number 10, Appendix B, page 22. This proposed alternative would harvest approximately 0.5 MMBF of timber. The proposed units include Unit 44 with a 30 percent removal by group selection and Units 64 and 67 with Group Selection 10 percent and Group Selection 30 percent, respectively. Units 64 and 67 are across both the Muddy River and Crystal Creek. The low volume proposed would not justify the cost of bridge construction or costs associated with helicopter logging.

### No New Roads

This proposal would have either required harvesting only in areas adjacent to previously harvested units or required helicopter logging in areas accessible by roads. It also would concentrate logging in high volume stands near Point Agassiz.

### Old-growth Habitat Reserve in the Ess Lake Area

A proposal to replace the Delta Creek Old-growth Habitat reserve with an Old-growth Habitat reserve surrounding Ess Lake was suggested. This suggestion had several positive aspects. However, after analyzing this possibility the IDT found that the Delta Creek Old-growth Habitat reserve better fit the Forest Plan criteria.

**Old-growth Habitat Reserve in the Headwaters of the Muddy River** The large block of contiguous old-growth in the headwaters of the Muddy River was considered for replacement of either of the other two blocks in VCU 489. This area receives less use by animals because of the higher elevation and more rugged terrain and therefore, is less desirable as an Old-growth Habitat reserve than those recommended in the action alternatives.

**Reconstruction of Road 6256** The DEIS proposed reconstruction of Road 6256 in its original location. Currently the Muddy River has eroded five places along this road route. Therefore, the FEIS recommends construction of a 1.6 mile section rerouted away from the Muddy River to avoid further erosion of the road.

## Design Elements Common to All Action Alternatives

**Beach and Estuary Buffers** Buffers of 1,000 feet are planned around all estuaries and along the shoreline in accordance with the Forest Plan (pages 4-4 and 4-5).

**Cultural Resources** All known or discovered cultural sites will be protected as required by statute (Forest Plan, pages 4-14 and 4-15). Timber sale contract provisions will require immediate protective measures if additional sites are discovered during timber harvesting and road construction operations.

**Great Blue Heron** One unit was deferred because of an active great blue heron nest. A forested buffer and a timing restriction will protect the nest (Forest Plan, page 4-116).

**Landscape Connectivity** An old-growth habitat corridor was identified to help maintain old-growth landscape connectivity between the medium Old-growth Habitat reserve north of the project area and the medium Old-growth Habitat reserve to the south, Stikine-LeConte Wilderness (Forest Plan, page 4-120).

**Logging Camps** Land will be made available for logging camp(s) if needed. All Best Management Practices (BMPs) associated with temporary camps will be followed (Forest Plan, Appendix C). Camps will be located to minimize conflicts with bears (Forest Plan, page 4-113).

**Log Transfer Facility (LTF)** All alternatives will have the same log transfer facility (LTF) design (Appendix A).

**Old-growth Habitat Reserves** An Old-growth Habitat reserve is a contiguous unit of old-growth forest habitat to be managed to maintain the integrity of the old-growth forest ecosystem. There are three small Old-growth Habitat reserves within the project area. All alternatives have these three reserves however, they vary in size and boundaries by alternative (Chapter 3).

**Reserve Trees and Snag Retention** In all clearcut with reserve harvest units, about 15 percent of the existing trees will be retained. The majority of the retained trees will be left in clumps. Where large amounts of unmerchantable trees exist, more than 15 percent of the trees may be retained if yarding system capability permits. These trees will provide structural diversity for wildlife and an old-growth legacy for the future stand. In addition, where safety permits, snags will be retained in all harvest units to provide wildlife habitat and a future source of downed woody material. Decaying woody material adds nutrients to the soil and provides wildlife habitat (Forest Plan, page 4-98).

## 2 Alternatives

### Road Closures

To reduce open road density, approximately 6.6 miles of existing open temporary road will be closed as funding becomes available. All new temporary road will be closed. Most of the new permanent road will be closed.

### Road Location

Roads were carefully located and will be constructed using Best Management Practices (Forest Plan, pages 4-105 through 4-108). These practices are designed to reduce or prevent adverse impacts especially impacts to wetlands, erodible soils, and water resources. Road locations avoid landslide prone areas. Roads will be located to avoid construction in open muskeg. Where feasible, stream crossings are located perpendicular to the channel to minimize the amount of clearing. Full bench construction and end hauling of excavated material will be required in designated areas to minimize soil erosion and to prevent sediment from entering streams (Road Cards, Appendix A). Material endhailed during road construction will be placed on stable areas away from flowing water. Existing roads are used wherever possible to minimize new road construction and may require reconstruction.

### Sort Yards

An area for log sorting has been identified. BMPs will be followed to minimize soil and water resource impacts from the sort yard (Forest Plan, Appendix C).

### Stream Buffers

The Tongass Timber Reform Act (TTRA) requires at least a 100 foot no-harvest buffer zone on each side of all Class I streams and on those Class II streams which flow directly into Class I streams. In addition, the Forest Plan (pages 4-53 through 4-73) prescribes varying Riparian Management Areas for all Class I, II, and III streams.

BMPs will be prescribed and implemented to minimize the risk of land management activities impairing water quality.

### 100 Acre Opening Limitations

No alternative creates any harvest openings that exceed 100 acres. Openings proposed in the various alternatives are generally less than 50 acres.

## Alternatives Considered in Detail

The IDT developed a proposed action based on preliminary scoping and management direction to meet the purpose and need. This proposed action is not necessarily the preferred alternative. After reviewing comments on the DEIS, the IDT developed one new action alternative, modified three of the action alternatives presented in the DEIS, and dropped Alternative 4 from further consideration. These four action alternatives address the purpose and need and respond to resource concerns and scoping comments. Each action alternative provides a mix of resource use and protection, emphasizing different resource values based on the theme for which the alternative was developed. The No Action Alternative proposes little change in the present management of the area.

Alternative maps (Figures 2-1 to 2-5) display general size and location of proposed harvest units and road locations. Table 2-1 summarizes how each alternative responds to the significant issues.

### Alternative 1 No Action

This alternative proposes no additional commercial timber harvest or road construction in the Crystal Creek Project Area at this time. Management activities, such as management of second-growth, road maintenance, free-use timber, and existing recreational developments will remain at current levels. To reduce open road density, approximately 6.6 miles of existing open temporary road currently not receiving public use will be closed as funding becomes available. About 9.4 miles of existing open temporary road will be converted to permanent road status.



Alternative 1 includes the small Old-growth Habitat reserves as designed by the Forest Plan.

## Alternative 2 Proposed Action

In Alternative 2, the level and timing of the timber harvest is designed to sustain a balance between high production forage and moose winter habitat. Openings to produce forage for moose would be created by clearcuts with reserve trees and group selection. Where possible, harvest openings will be made in lower volume timber stands to minimize impact on winter habitat. Moose winter range habitat needs will be met by forest not available for harvest and forest designated for single-tree selection harvest. Thinning and/or pruning of existing second-growth timber would be emphasized to prolong moose forage production. A three-sided recreation shelter and associated access trail is proposed for the north end of Ess Lake.

Alternative 2 has been modified from the DEIS by deferring part of one unit to avoid steep slopes. One unit was modified to buffer a great blue heron nest. The silvicultural prescription on four units was changed so that group selection is proposed for units with uphill cable logging.

Alternative 2 will include a wetland enhancement project to increase fish habitat and wetland vegetation along Road 6256. Erosion control will be conducted to protect a second wetland from being eroded by the Muddy River.

To reduce open road density, approximately 6.6 miles of existing open temporary road currently not receiving public use will be closed as funding becomes available. About 9.4 miles of existing open temporary road will be converted to permanent road status.

The small Old-growth Habitat reserves proposed in Alternative 2 reflect minor modifications made by the IDT to the Forest Plan Old-growth Habitat reserves in order to better identify them on the ground. Boundaries used included streams, large muskegs, land ownership boundaries, and existing clearcuts. The Delta Creek Old-growth Habitat reserve north of the Patterson River was analyzed to meet the Forest Plan criteria.

## Alternative 3

This alternative focused the timber harvest within the Forest Plan Timber Production and Modified Landscape LUDs (Upper Muddy River area) and avoids timber harvest in the Point Agassiz area. Helicopter logging is used to access timber where roads cannot be constructed using standard specifications.

Alternative 3 has been modified from the DEIS by deferring three units for a landscape connectivity corridor and to avoid steep slopes. One unit was deferred to buffer a great blue heron nest.

Thinning and/or pruning of existing second-growth timber would be planned to prolong moose forage production.

To reduce open road density, approximately 6.6 miles of existing open temporary road currently not receiving public use will be closed as funding becomes available. About 9.4 miles of existing open temporary road will be converted to permanent road status.

Alternative 3 will include a wetland enhancement project to increase fish habitat and wetland vegetation along Road 6256. Erosion control will be conducted to protect a second wetland from being eroded by the Muddy River.

The size of the small Point Agassiz Old-growth Habitat reserve more than doubled (from 2,350 acres to 5,600 acres) to follow recommendations from U.S. Fish and Wildlife Service and Alaska Department of Fish and Game. The small Brown Cove Old-growth Habitat



## 2 Alternatives

reserve was increased by about 200 acres by adding acreage in the Crystal Creek drainage. The small Old-growth Habitat reserve north of the Patterson followed modifications by the IDT as described in Alternative 2.

### Alternative 5

This alternative builds the least amount of road to meet the timber harvest objectives while minimizing resource concerns. Within the Point Agassiz area, extensive use of single-tree selection is proposed to maintain old-growth habitat characteristics in high volume stands. A three-sided recreation shelter and associated access trail is proposed for the north end of Ess Lake.

Thinning and/or pruning of existing second-growth timber would be planned to prolong moose forage production.

To reduce open road density, approximately 6.6 miles of existing open temporary road currently not receiving public use will be closed as funding becomes available. About 9.4 miles of existing open temporary road will be converted to permanent road status.

Small Old-growth Habitat reserves are the same design as Alternative 2.

### Alternative 6

Alternative 6 was designed by modifying Alternative 2 to better address biodiversity. The Point Agassiz Old-growth Habitat reserve boundaries were adjusted to incorporate more high-volume forests that provide better habitat for old-growth associated species. The small Brown Cove Old-growth Habitat reserve incorporated the recommendations of the U. S. Fish and Wildlife Service and Alaska Department of Fish and Game as designed in Alternative 3. This alternative also reduces road construction and harvesting within the Crystal Creek watershed compared to Alternatives 2 and 3. A three-sided recreation shelter and associated access trail is proposed for the north end of Ess Lake.

Thinning and/or pruning of existing second-growth timber would be planned to prolong moose forage production.

To reduce open road density, approximately 6.6 miles of existing open temporary road currently not receiving public use will be closed as funding becomes available. About 9.4 miles of existing open temporary road will be converted to permanent road status.

This alternative also buffers the great blue heron nest and provides for a landscape connectivity corridor. Road 44920 was shortened by approximately  $\frac{3}{4}$  of a mile and Unit 81 was dropped in Alternative 6 to increase goat habitat protection.















Alternative 6 includes a wetland enhancement project to increase fish habitat and wetland vegetation along Road 6256. Erosion control will be conducted to protect a second wetland from being eroded by the Muddy River.

### Identification of the Forest Service Preferred Alternative

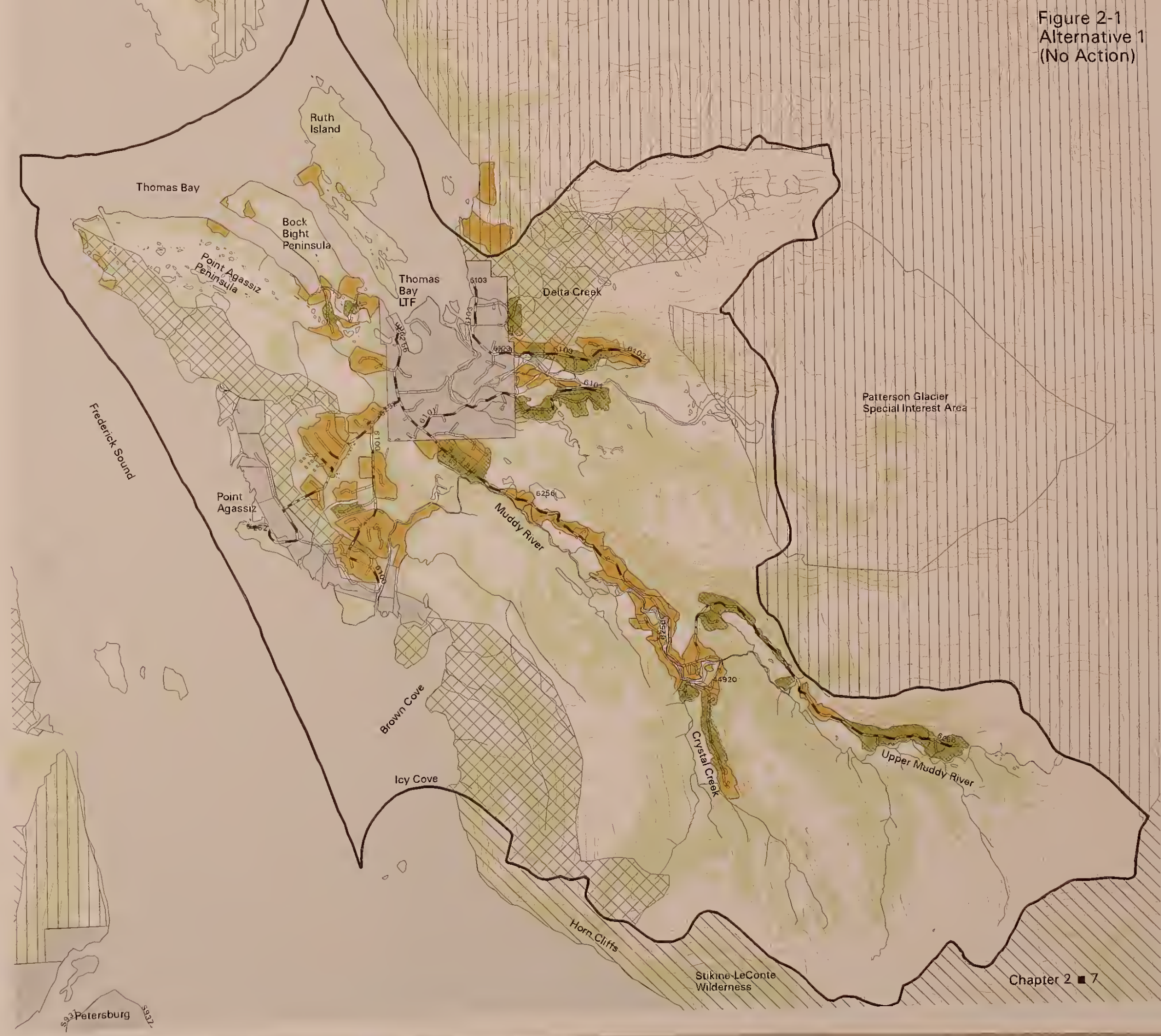
Alternative 6 is the Preferred Alternative. Alternative 6 was designed following incorporation of many comments made regarding the Draft Environmental Impact Statement.

Figure 2-1  
Alternative 1  
(No Action)

Legend

-  Saltwater
-  Wilderness
-  Old Growth Reserves
-  Other Non-Development LUD
-  Proposed Pre-Commercial Thinning and Pruning Units
-  Existing Managed Stands
-  Non-National Forest Lands
-  Productive Old Growth
-  Log Transfer Facility (LTF)
-  Crystal Creek Project Area Boundary
-  Existing Permanent Roads
-  Existing Closed Roads\*
-  Shoreline, Lakes, Class I/II Streams
-  Contour Interval 500 ft

\*Approximately 6.6 miles of these roads will be closed. Refer to Figure A-4 in Appendix A.



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Figure 2-2  
Alternative 2

# Legend

## PROPOSED HARVEST UNITS:

- Clearcut with Reserves
- Group Selection - 30% Removal
- Single Tree Selection - 20% Removal
- Single Tree Selection

- Productive Old Growth
- Existing Managed Stands
- Proposed Pre-Commercial Thinning and Pruning Units
- Non-National Forest Lands
- Saltwater
- Wilderness
- Other Non-Development LUD
- Proposed Old Growth Habitat Reserves
- Crystal Creek Project Area Boundary
- Existing Permanent Roads
- Existing Closed Roads\*
- New Permanent Roads
- New Temporary Roads
- Shoreline, Lakes, Class I/II Streams
- Contour Interval 500 ft
- Log Transfer Facility (LTF)
- Ess Lake Shelter
- Wetland Enhancement Projects

\*Approximately 6.6 miles of these roads will be closed. Refer to Figure A-4 in appendix A.

0 7920 15840

Scale is 1 inch = 7920 feet

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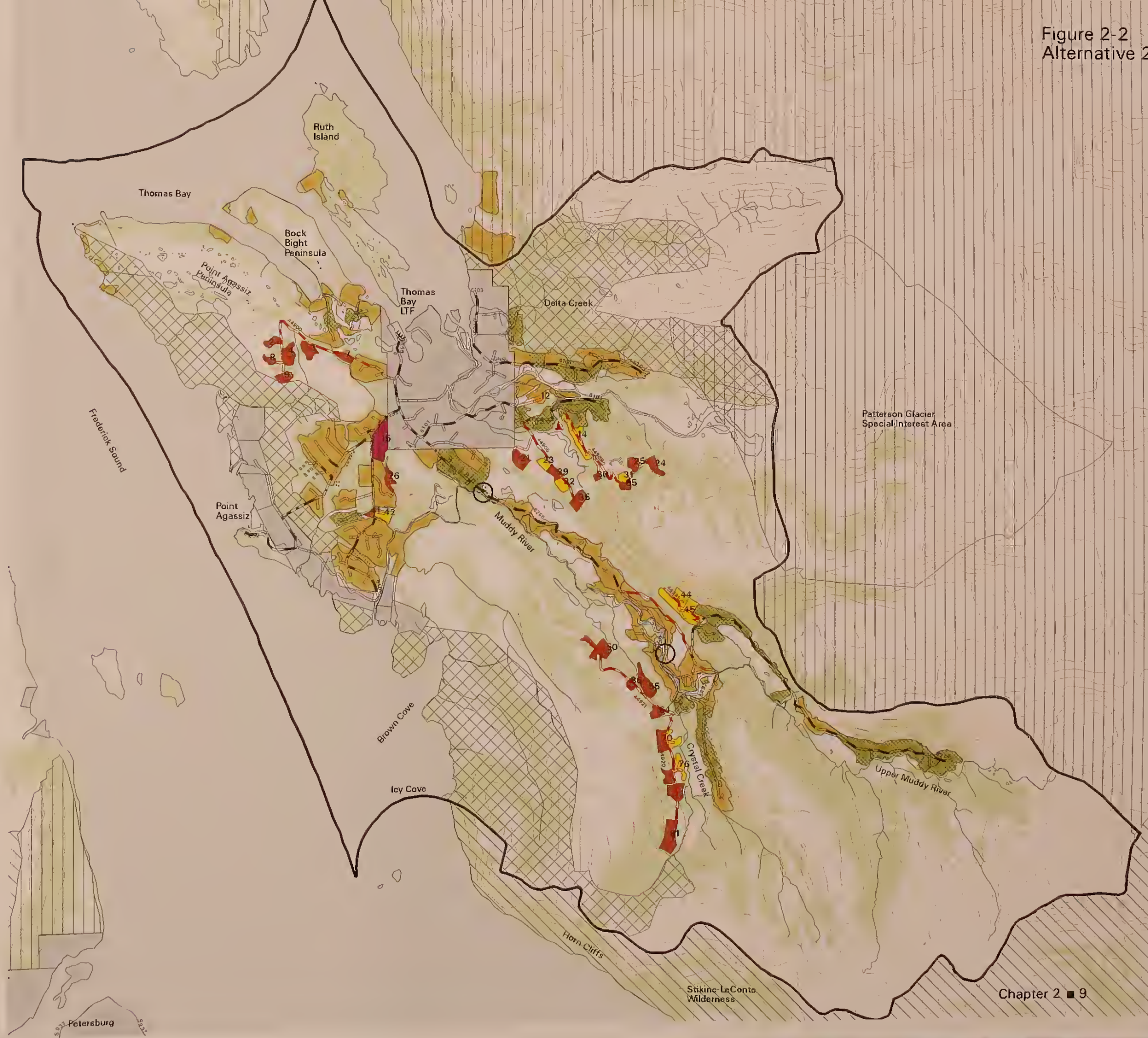






Figure 2-3  
Alternative 3

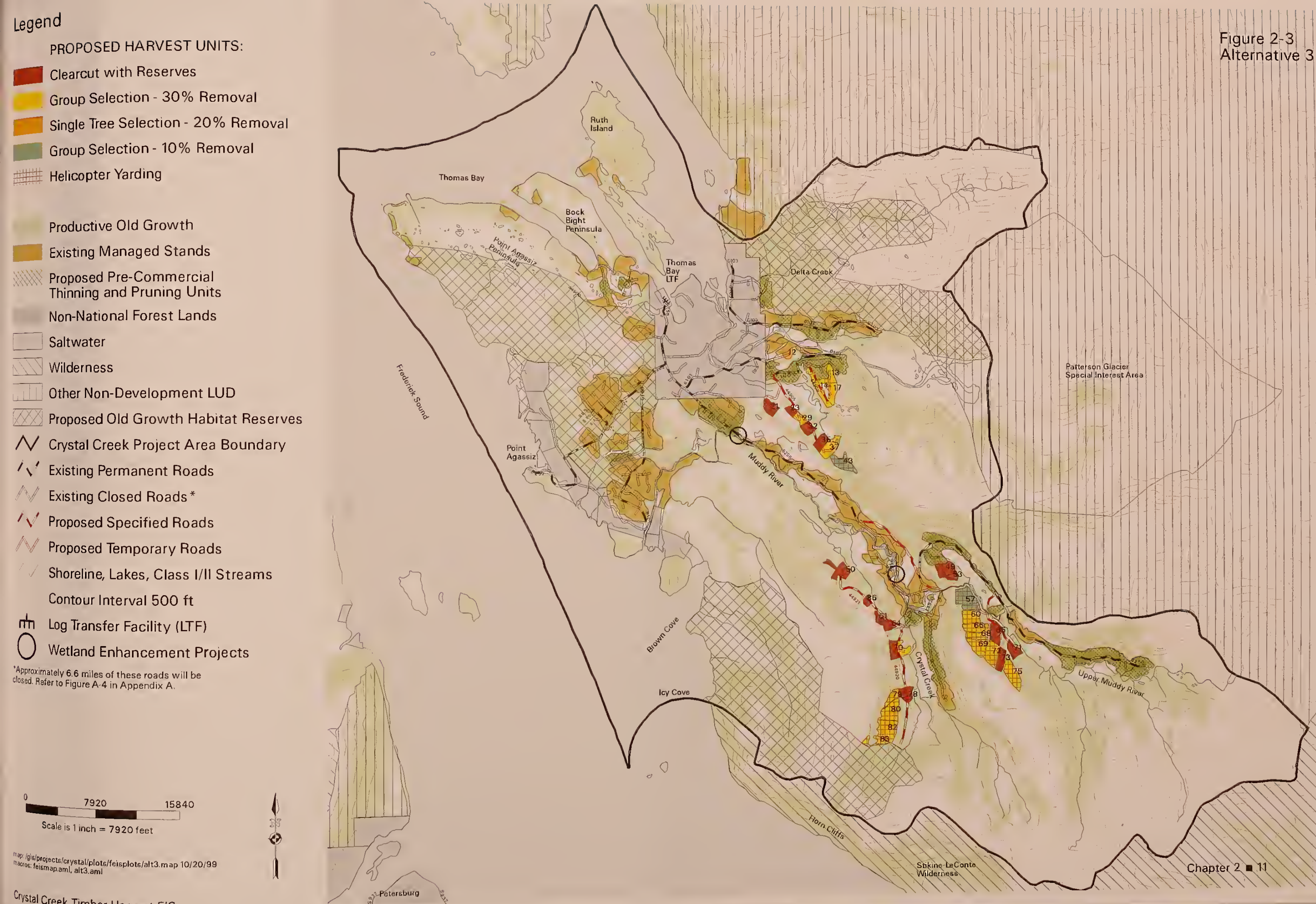






Figure 2-4  
Alternative 5

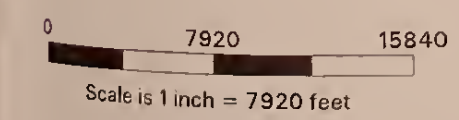
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PROPOSED HARVEST UNITS:

- Clearcut with Reserves
- Group Selection - 30% Removal
- Group Selection - 40% Removal
- Single Tree Selection - 20% Removal
- Single Tree Selection

- Productive Old Growth
- Existing Managed Stands
- Proposed Pre-Commercial Thinning and Pruning Units
- Non-National Forest Lands
- Saltwater
- Wilderness
- Other Non-Development LUD
- Proposed Old Growth Habitat Reserves
- Crystal Creek Project Area Boundary
- Existing Permanent Roads
- Existing Closed Roads \*
- Proposed Specified Roads
- Proposed Temporary Roads
- Shoreline, Lakes, Class I/II Streams
- Contour Interval 500 ft
- Log Transfer Facility (LTF)
- Ess Lake Shelter

\*Approximately 6.6 miles of these roads will be closed. Refer to Figure A-4 in Appendix A.



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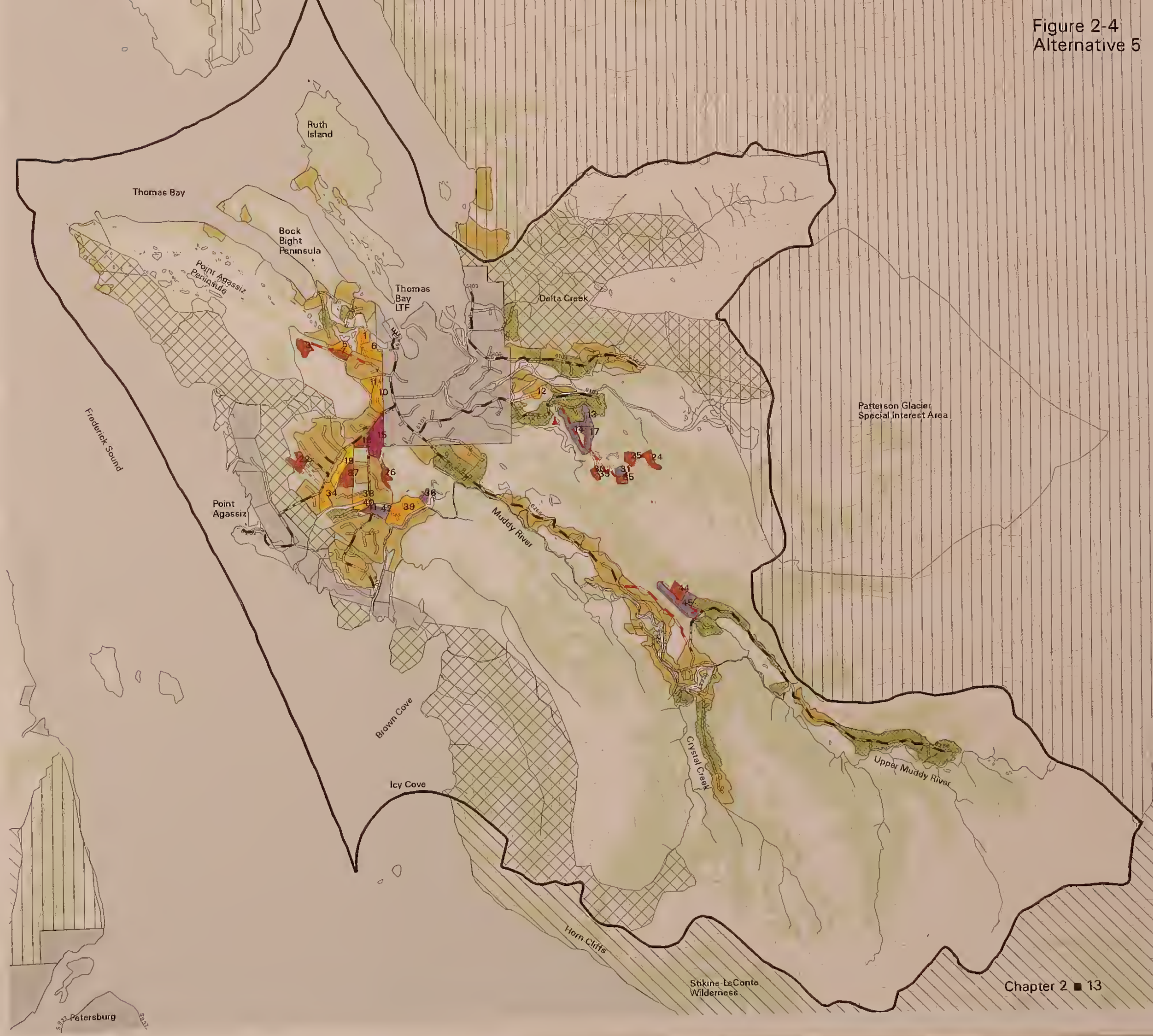




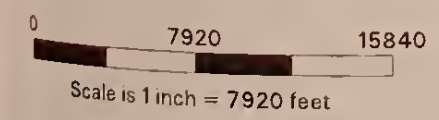


Figure 2-5  
Alternative 6  
(Preferred)

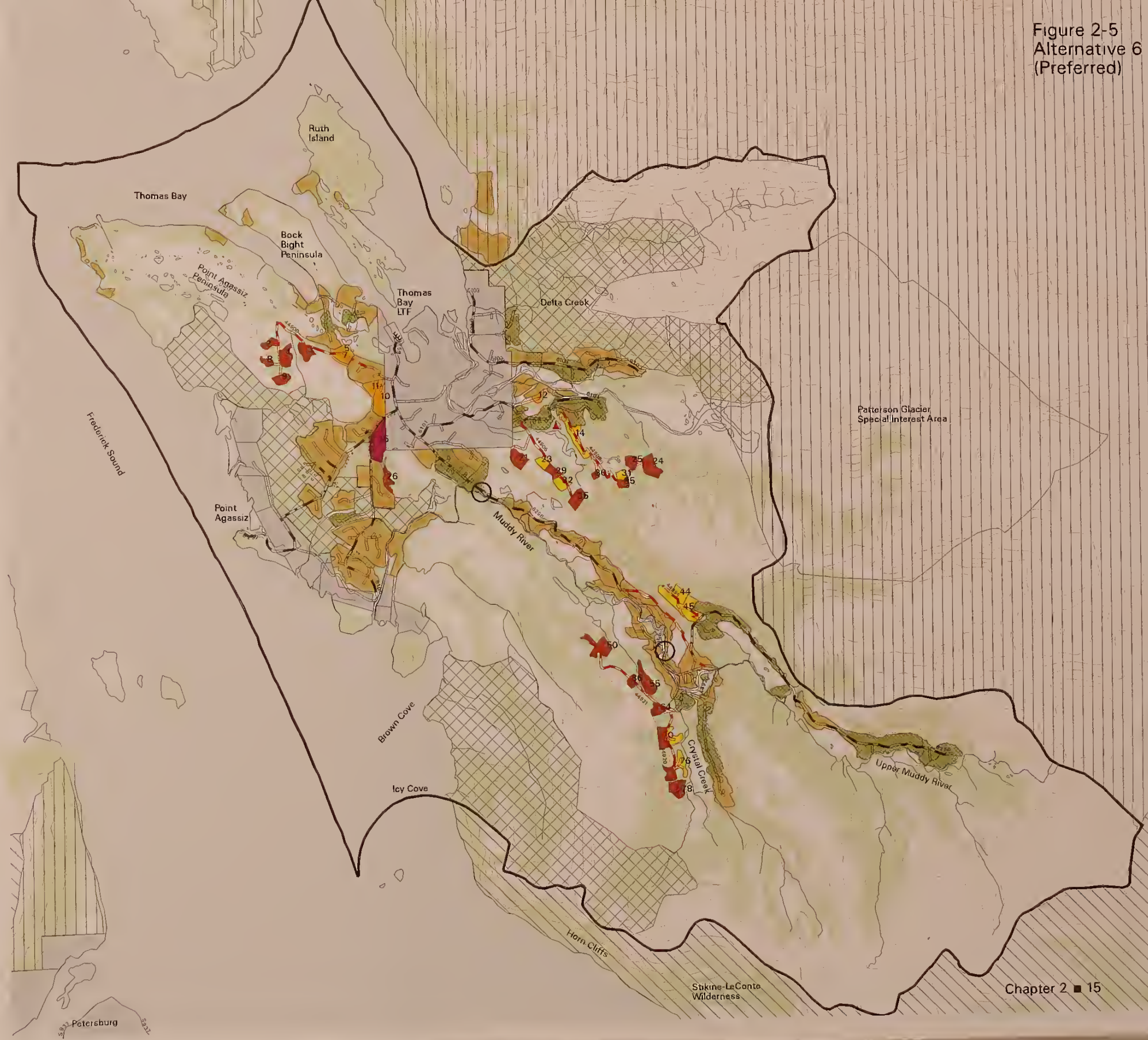
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- PROPOSED HARVEST UNITS:
- Clearcut with Reserves
  - Group Selection - 30% Removal
  - Single Tree Selection - 20% Removal
  - Single Tree Selection
- 
- Productive Old Growth
  - Existing Managed Stands
  - Proposed Pre-Commercial Thinning and Pruning Units
  - Non-National Forest Lands
  - Saltwater
  - Wilderness
  - Other Non-Development LUD
  - Proposed Old Growth Habitat Reserves
  - Crystal Creek Project Area Boundary
  - Existing Permanent Roads
  - Existing Closed Roads\*
  - Proposed Specified Roads
  - Proposed Temporary Roads
  - Shoreline, Lakes, Class I/II Streams
  - Contour Interval 500 ft
  - Log Transfer Facility (LTF)
  - Ess Lake Shelter
  - Wetland Enhancement Projects

\*Approximately 6.6 miles of these roads will be closed. Refer to Figure A-4 in Appendix A.



map: /gis/projects/crystal/plots/feisplots/alt6.map 10/20/98  
macros: feismap.aml, alt6.aml







**Table 2- 1. Alternative Comparison**

| Units of Measure   | Alt. 1   | Alt. 2       | Alt. 3       | Alt. 5       | Alt. 6       |
|--|----------|--------------|--------------|--------------|--------------|
| <b>Issue 1. Timber Management and Economics</b>  |          |              |              |              |              |
| Total volume harvested (MMBF)  | 0        | 15.1         | 16.4         | 11.8         | 14.2         |
| Harvested Acres by silvicultural prescription  |          |              |              |              |              |
| Clearcut with Reserve Trees-85% Removal  | 0        | 610          | 460          | 284          | 541          |
| Group Selection - 10% Removal  | 0        | 0            | 13           | 0            | 0            |
| Group Selection - 30% Removal  | 0        | 92           | 204          | 14           | 85           |
| Group Selection - 40% Removal  | 0        | 0            | 0            | 103          | 0            |
| Single Tree Selection - 20% Removal  | 0        | 3            | 3            | 75           | 28           |
| Single Tree Selection - 0%, 20%, 40%, 60% Removal  | 0        | 24           | 0            | 24           | 24           |
| <i>Total Proposed Harvested Acres</i>  | <i>0</i> | <i>729</i>   | <i>680</i>   | <i>500</i>   | <i>678</i>   |
| <i>Total Proposed Unit Acres</i>   | <i>0</i> | <i>1,015</i> | <i>1,286</i> | <i>1,050</i> | <i>1,046</i> |
| Opportunity for Small Sales (MMBF) <sup>1</sup>  | 0        | 1.9          | 0.1          | 7.5          | 2.3          |
| Relative Economic Ranking  | --       | 4            | 3            | 1            | 2            |
| <b>Issue 2. Moose Management</b>   |          |              |              |              |              |
| Percent Change in estimated moose habitat capability from present to year 2010 <sup>2</sup>  | -15%     | -11%         | -12%         | -12%         | -11%         |
| Percent of proposed high-forage openings compared to the optimum harvest rate suggested by the moose model (100 percent is optimum) <sup>3</sup> |          |              |              |              |              |
| West Muddy Moose Habitat Management Area <sup>4</sup>  | 0%       | 76%          | 0%           | 91%          | 61%          |
| East Muddy Moose Habitat Management Area   | 0%       | 68%          | 45%          | 14%          | 54%          |
| Patterson Moose Habitat Management Area  | 0%       | 106%         | 94%          | 73%          | 118%         |
| Upper Muddy Moose Habitat Management Area  | 0%       | 44%          | 265%         | 80%          | 44%          |
| <b>Issue 3 Biodiversity</b>  |          |              |              |              |              |
| Productive Old-Growth  |          |              |              |              |              |
| Acres of Productive Old-Growth Remaining after Harvest   | 24,600   | 23,898       | 23,923       | 24,199       | 23,974       |
| Percent of 1954 <sup>5</sup> Productive Old-Growth Remaining   | 83%      | 80.6%        | 80.7%        | 81.7%        | 80.9%        |
| Acres of Productive Old-growth in Old-growth Habitat reserves  | 5,490    | 6,320        | 7,530        | 6,320        | 6,380        |
| Acres of highest volume stands modified by harvest   | 0        | 114          | 11           | 546          | 191          |
| Percent of 1954 total  | 0.0%     | 1.4%         | 0.1%         | 7.0%         | 2.4%         |
| Percent Change in the estimated deer habitat capability from Present (1998)  |          |              |              |              |              |
| By Year 2000   | 0%       | -1.1%        | -1.3%        | -0.8%        | -1.0%        |
| By Year 2010   | +1.4%    | +0.1%        | 0%           | +0.5%        | +0.2%        |
| By Year 2040   | 0%       | -1.7%        | -1.7%        | -1.1%        | -1.6%        |

<sup>1</sup> For this discussion, small sales are those less than one million board feet with no permanent road building.

<sup>2</sup> Includes second growth management and created openings (Clearcut with Reserves and Group Selection)

<sup>3</sup> A value much greater than 100% implies that it will be difficult to balance winter range and high-forage areas in the later stages of the timber harvest rotation within the Moose Habitat Management Area. A value much lower than 100% implies that the lack of high-forage habitat may soon limit moose numbers within the Moose Habitat Management Area without further logging or more intensified treatment of existing second growth.

<sup>4</sup> See the Moose Habitat Management Area Map (Figure 3-3) for the locations of the areas.

<sup>5</sup> 1954 is the date prior to commercial logging in the project area.

**Table 2-1 (continued)**

| Units of Measure   | Alt. 1 | Alt. 2 | Alt. 3 | Alt. 5 | Alt. 6 |
|--|--------|--------|--------|--------|--------|
| Percent Change in estimated marten habitat capability from Present to Year 2040  | -1%    | -2%    | -2%    | -2%    | -2%    |
| Percent Change in estimated brown creeper habitat capability from Present to Year 2040   | 0%     | -0.8%  | -0.6%  | -1.8%  | -0.4%  |
| Percent Change in estimated wolf habitat capability from Present to Year 2040  | 0%     | 0%     | 0%     | 0%     | 0%     |
| Estimated open road density (miles/square miles of project area) post-timber harvest <sup>6</sup> with road closures (miles/square mile)   | 0.27   | 0.29   | 0.30   | 0.29   | 0.29   |
| Acres of proposed timber harvest in mountain goat winter range.  | 0      | 265    | 409    | 144    | 224    |
| Number of miles between the Horn Cliffs mountain goat hunting area <sup>7</sup> and closed roads after harvest                             | 1.75   | 0.6    | 0.6    | 1.75   | 0.8    |
| <b>Issue 4. Recreation</b>   |        |        |        |        |        |
| Construction of three-sided shelter and access trail at Ess Lake   | no     | yes    | no     | yes    | yes    |
| Number of acres that change from Semi-Primitive to Roaded Recreation Opportunity Spectrum (ROS) Class                                      | 0      | 5,130  | 4,690  | 1,550  | 3,650  |
| Number of harvested acres seen from Visual Priority Travel Routes and other use areas.   | 0      | 150    | 127    | 147    | 150    |
| <b>Issue 5 Transportation</b>  |        |        |        |        |        |
| Miles of new permanent road construction   | 0      | 15.6   | 11.5   | 6.5    | 14.9   |
| Miles of new temporary road construction   | 0      | 6.7    | 4.6    | 8.0    | 6.8    |
| Total miles of permanent road to be left open after harvest <sup>8</sup>   | 26.6   | 29.1   | 29.7   | 29.1   | 29.1   |
| <b>Other Environmental Considerations</b>  |        |        |        |        |        |
| <b>Subsistence</b>   |        |        |        |        |        |
| The estimated subsistence demand may likely exceed habitat capability (significant possibility of significant restriction)                 | no     | no     | no     | no     | no     |
| Restrictions to existing access to subsistence resources are likely  | no     | no     | no     | no     | no     |
| Increased competition between users for subsistence resources is likely to result in restriction to current harvest seasons and bag limits | no     | no     | no     | no     | no     |
| <b>Hydrology</b>   |        |        |        |        |        |
| Percent of Planning Area in second-growth less than 30 years old   | 2.6    | 3.7    | 3.6    | 3.3    | 3.6    |

<sup>6</sup> Almost all miles of new permanent road and all new temporary road will be closed following harvest. In addition, 6.6 miles of currently opened temporary roads will be closed.

<sup>7</sup> The Horn Cliffs goat hunting area is estimated to be the habitat above 2000 feet elevation on the Horn Mountains Range.

<sup>8</sup> Includes existing roads and proposed roads.



## Mitigation

The following mitigation measures would be required for implementing the project. For mitigation measures specific to each unit and road segment, refer to Appendix A.

### Heritage Resources

- If cultural sites are discovered during project implementation, the district archaeologist will be consulted. Cultural resource sites will be protected with timber sale contract provisions.

### Scenic Quality

- Group selection and reserve trees in clearcuts were prescribed to limit unit visibility from key viewing locations. Some harvest units were deferred from harvest in this project because they would create a cumulative amount of scenic impact and could not be otherwise mitigated. Unit boundaries will be shaped or feathered to blend into the surrounding landscape. Although not a specific mitigation measure for scenery, both the 1,000 foot beach and riparian buffers will help screen areas of harvest from view and provide color and texture to reduce visual contrast.

### Water Quality and Fisheries

- The Tongass Timber Reform Act (TTRA) directed the Forest Service to protect fish bearing streams with a minimum 100 foot no harvest buffers. In addition, the Forest Plan Riparian Standards and Guidelines provide additional stream protection through the use of riparian management areas beyond the designated TTRA buffers. The width of these riparian management areas varies depending upon the channel type. These riparian area Standards and Guidelines add protection to non-fishery streams. The Forest Plan also directs problems within watersheds be identified and corrected to improve water quality. All streams within units will be field verified during unit layout when unit boundaries are marked.
- Full bench construction and end hauling of excavated material would be required on designated areas to minimize soil erosion and to prevent sediment from entering streams (Road Cards, Appendix A). Material endhauled during road construction will be placed on stable areas away from flowing water.
- Roads will be closed by adding waterbars at appropriate places and removing drainage structures. Erosion control needed would be accomplished before closing roads.
- Timing restrictions on in-stream road construction work would be implemented during critical periods to protect fishery resources (Road Cards, Appendix A).
- Stream crossings of Class I and II streams would be constructed to allow fish passage.

- To reduce soil disturbance and to protect fish passage, temporary bridges instead of culverts will be used at:
  - ◊ milepost 1.60 and 2.80 on Road 44920;
  - ◊ mileposts 1.15 and 2.00 on Road 44900;
  - ◊ mileposts 0.65 and 1.00 on Road 44990;
  - ◊ milepost 0.15 on Road 44905; and
  - ◊ milepost 0.56 on Road 44921.

Other locations may be identified during final engineering design.

### Wildlife

- All timber harvest units in the selected alternative will be searched for raptor and great blue heron nests prior to and/or during implementation. Proposed thinning/pruning units will be reviewed by the wildlife biologist prior to implementation. Nest searches will be conducted in all proposed second growth treatment units and adjacent areas if the biologist thinks there is a reasonable likelihood of raptor nests being present. If nests are found, habitat protection and timing restrictions will be established in accordance with the Forest Plan Standards and Guidelines.
- The great blue heron nest found in the Crystal Creek watershed will be protected with a forested buffer and timing restriction between March 1 and August 15.
- Loss of old-growth habitat is mitigated by Old-growth Habitat reserves, riparian buffers, beach and estuary buffers. Other methods used to mitigate against loss of wildlife habitat include single-tree selection, group selection, and retaining reserve trees within clearcut harvest units. Old-growth habitat will also remain on areas unsuitable for timber harvest and in areas deferred from timber harvest for this project.
- Thinning and/or pruning will be done where possible to maintain understory for wildlife forage in existing second-growth stands.
- In accordance with the Forest Plan, buffers of 330 feet have been designated around wetlands where waterfowl nesting and brood-rearing is likely. Any harvest within this buffer, is limited to single-tree selection or group selection. Timing clauses during April 1 to July 31 will limit logging activities during nesting and brood-rearing. Some large-diameter trees may be topped to provide for future nest sites. Existing and future snags will be emphasized in the retention of reserve trees in units near known goose nesting areas.
- Roads constructed into the Crystal Creek drainage or the Ess Lake area will be closed after timber harvest is complete. The Muddy River crossing into the Crystal Creek drainage will be closed to public motorized use during logging activities to limit increased harvest of the Horn Cliff's mountain goat population and wolves. A motorized closure to further protect the Horn Cliff's mountain goat population following harvest will also be implemented.
- Helicopter over flights of goat spring and summer range during logging operations will be restricted in the Upper Muddy and Crystal Creek drainages. Forested travel corridors will be maintained to allow goat movement in the Crystal Creek and Upper Muddy River drainages.
- Forest Service personnel and contracted workers involved with the project who may access the project area by boat will be familiarized with the 1998 Alaska Marine Mammal Viewing Guidelines or most current guidelines.

- To protect swan wintering habitat, timing restrictions on construction and right-of-way clearing will be put on Road 6256 and Road 44920 between October 15 and April 15. Similar timing restrictions will be placed on the Muddy River wetlands enhancement projects (Wetland Cards, Appendix A). Where this segment of Road 6256 is visible from the wetlands, alder or other suitable vegetation will be planted along the road to screen traffic from the wetlands.

## Monitoring

The Crystal Creek project will be incorporated into the forest-wide monitoring and evaluation plan as described in the Forest Plan, Chapter 6. Some of the units will be used as part of the forest-wide monitoring. These units will be evaluated for implementation of the appropriate Standards and Guidelines and appropriate Best Management Practices. The effectiveness of the Standards and Guidelines and Best Management Practices will also be evaluated. Validation monitoring is used to examine whether the assumptions and predicted effects are accurate.

### Implementation Monitoring

#### Sale Preparation

The IDT prepared unit cards for each harvest unit (Unit Cards, Appendix A). Unit cards include a unit map and a narrative explaining their concerns and how the concerns could be addressed in the design of each unit. Road Management Objectives were developed for each road (Road Cards, Appendix A). From these two documents, Forest Service personnel experienced in sale preparation and road design will mark units and roads on the ground in a manner that reflects management direction including the mitigation measures prescribed in the EIS and ROD. During this phase, minor changes may be made to reflect the mitigation measures. This preparation step involves a "plan-in-hand" unit and road layout review of the timber sale by the IDT to ensure that planned project elements have been incorporated.

#### Sale Administration

Implementation monitoring continues through harvest and contract inspections by trained sale administrators and road inspectors as a routine part of project implementation. Through provisions contained in the timber sale contract, sale administrators and road inspectors ensure that the prescriptions contained on the unit and road cards are implemented. Sale administrators and contract inspectors have the authority to initiate action to repair resource damage and suspend operations until problems have been corrected. This process ensures that project elements and Forest Plan Standards and Guidelines are implemented as designed.

#### Watershed

Activities such as buffer strip retention, seeding to reduce erosion, and waterbar installation will be monitored.

### Effectiveness Monitoring

Regular programmatic monitoring done at the District or Forest level will be done on a regularly scheduled basis. Only project-specific monitoring is included in this document.



### **Timber Restocking**

Objective: Ensure that restocking occurs within time frames stated in the National Forest Management Act.

Method: Conduct stocking surveys 3 and 5 years after harvest.

Action: Determine if stocking is adequate. Prescribe planting if natural regeneration is inadequate.

### **Tree Retention In Clearcut with Reserves Units**

Objective: Document the amount, type, and distribution of trees, snags, and down trees retained within clearcut with reserve harvest units.

Method: Visually estimate in a random survey one year after harvest.

Action: Determine tree species, size, and distribution (clumps vs. scattered).

### **Use of Temporary Bridges**

Objective: To ensure that the bridges maintain water quality, fish passage, and provide an economic alternative to culverts.

Method: Water quality, fish passage, and stream crossing costs will be monitored.

Action: Determine if water quality and fish passage are maintained and compare cost to culvert use.

### **Construction of Erosion Control Structure**

Objective: To prevent further erosion on a wetland adjacent to the Muddy River (Appendix A).

Method: The log and rootwad structure along the Muddy River will be evaluated to determine if erosion stops, to prevent disturbance of the wetland.

Action: If the erosion continues, the design will be reevaluated.

### **Muddy River Wetland Enhancement Monitoring**

Objective: Determine if fish passage is maintained.

Method: Inspect the wetland for presence of coho fry for at least two years following construction.

Action: If fish are not present, further measures will be taken to allow passage into the wetland.

### **Wildlife Harvest**

Objective: Determine if changes occur in the harvest rates of goats, moose, deer, marten, and wolves within the project area and within the Horn Cliffs goat population.

Method: Annually review Alaska Department of Fish and Game harvest data to determine harvest rates of the above populations. Coordinate with Alaska Department of Fish and Game to identify what percent of the successful Horn Cliff goat hunters are using roads within the project area for access.

Action: If harvest of any of the above wildlife populations appear to be excessive, work with Alaska Department of Fish and Game to determine if changes are needed in road management or hunting regulations.

### **Single-Tree Selection Harvest**

**Objective:** Determine the effects of single-tree selection harvest in Units 12 and 15 on understory forage and winter use by moose and deer.

**Method:** Establish understory vegetation plots and conduct spring pellet counts in these units prior to harvest. Resample for understory vegetation and spring pellet-group densities approximately 3 and 7 years after logging.

**Action:** Analyze the results for future use of the prescription. Determine if further monitoring is warranted.

### **Swan Use of Wetlands Adjacent to Road 6256**

**Objective:** Determine if swans continue to use the wetlands after road construction.

**Method:** Periodic check of pond area in spring and fall to see if swans are present.

**Action:** If swans are not there, will evaluate to determine if road closures or other mitigation methods are warranted.

## **Validation Monitoring**

Most validation monitoring is conducted in partnership with the forest research scientists on a Forest-wide basis and is beyond the scope of this project.

### **Cultural Resources**

**Objective:** Validate assumptions of cultural resources probability model.

**Method:** Field observations along reconstructed and newly constructed roads.

**Action:** Determine if assumptions of cultural resources model require adjustment.

# 2 Alternatives



# **Chapter 3**

## **Affected Environment and Environmental Consequences**

## CHAPTER 3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES3-1

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# Chapter 3

## Affected Environment and Environmental Consequences

### Introduction

In this chapter, we describe the environmental effects associated with five significant issues. The significant issues are timber management and economics, moose management, biodiversity, recreation, and transportation. Other concerns raised during public scoping that are not significant issues because they are mitigated in all alternatives or are not significantly affected by any alternative are also discussed. Some other findings required by policy and law are included at the end of the chapter.

### Issues

#### Issue 1- Timber Management and Economics

##### Forest Ecology

Timber stands in the project area average about 80 percent western hemlock, 13 percent yellow-cedar and 7 percent Sitka spruce. Mountain hemlock also occurs in some stands. The most prevalent understory plants are blueberry and shield fern. Western hemlock is the most common tree species to regenerate in these stands. The site index varies from 75 to 100 based on 50 years of growth. This means that a tree will theoretically grow 75 to 100 feet tall in 50 years.

Most stands display old-growth characteristics. In the Crystal Creek project area, there is relatively little evidence of second growth resulting from various types of natural disturbance, such as windthrow. One naturally-occurring second-growth stand on the south side of the Patterson River is attributed to recent glacial retreat. Alluvial flood zones and river terraces along the Patterson have even-aged stands. With one known exception along the upper Muddy River, windthrow tends to create small (less than five acres), scattered even-aged stands. This suggests that winds created conditions similar to those observed on protected north aspects on nearby Mitkof Island.



# Timber Management and Economics

## Silvicultural Systems

Even-aged, uneven-aged, and two-aged silvicultural systems are approved for use by the Forest Plan depending on the management objectives of the area and were considered by the IDT. Even-aged management is recommended for producing fast-growing, healthy stands of mixed species. In addition, even-aged silvicultural systems may be used to emulate natural catastrophic disturbance or create high-value forage. Two-aged management creates stand structure by retaining some overstory and residual trees. Uneven-aged management is used to harvest timber when the retention of a canopy cover is desired. Only two-aged and uneven-aged silvicultural systems are used on this project.

## Silvicultural Prescriptions

The silvicultural prescriptions used in the analysis follow below. Table 3-1 shows acres and volume harvested by silvicultural prescription for each alternative.

### Clearcutting With Reserve Trees - Two-aged Management

The main objective is to provide timber in a cost effective manner, while minimizing impacts to other resources. Unit boundaries will be located with sensitivity to resource concerns and mitigating circumstances including visuals, riparian habitat, soil instability, windthrow probability, and wildlife habitat.

Approximately 15 percent of the trees will be retained, creating a two-layered canopy structure with two or more age-classes. More trees may be retained, where feasible, in stands with high timber defect. Trees will be selected based on windfirmness, operational feasibility and safety, and wildlife habitat value. The number and distribution of the leave trees will depend on the logging design as shown on the implementation cards and the amount of stand structure available which meets the selection criteria. If the units are designed for cable yarding, approximately 15 percent of the trees will be left in clumps and stringers along yarding split lines and roads. Where feasible (generally in shovel or tractor yarded units), more trees may be retained and can be more evenly distributed across the unit. Current silvicultural knowledge of this planning area suggests the biological rotation length will range from 90 years on highly productive sites to 160 years on low productivity sites. Portions of the Ess Lake viewshed may have the rotation extended to about 165 years to meet visual quality standards.

Regeneration following clearcut with reserve harvest may need to be thinned approximately twenty years after harvest. Desired spacing will be about 16 feet between trees. These openings may provide wildlife browse. Some unthinned areas may be distributed throughout the thinned areas to provide cover for wildlife. The thinning will leave dominant trees which are free of insect and disease infestation, as well as physical deformities. Some stands may require a second thinning and possibly pruning to maintain understory for wildlife browse and to enhance timber quality.

### Group Selection - Uneven-aged Management

Group selection provides a residual tree canopy following harvest which would benefit scenery, wildlife, and soil stability. This prescription includes at least three entries, removing trees in groups less than two acres in size and can create a mosaic of irregular openings within the stand. Each opening will regenerate trees with a uniform size; at the end of the rotation, the result will be an uneven-aged stand.

Each group will consist of a mixture of merchantable tree sizes. Groups of trees infected with dwarf mistletoe will be high priorities for harvest.

There were three different group selection prescriptions developed:

- 10 percent of the trees will be removed every 20 years (200-year rotation). The

# Timber Management and Economics

groups of trees will usually be less than one acre in size. This will emulate small openings that naturally occur in the Crystal Creek Project Area.

- 30 percent of the trees will be removed every 30 to 40 years (90- to 120-year rotation). Groups of trees will usually be one to two acres in size. Ten percent of the trees will be retained as reserve trees to more closely emulate old-growth stand characteristics following the final harvest.
- 40 percent of the trees will be removed on the first entry with 30 percent removed on two subsequent entries, spaced about 30 to 40 years apart (90- to 120-year rotation). Groups of trees will usually be one to two acres in size. No reserve trees will be retained at the final harvest. This system was designed to make group selection more economical while maintaining old-growth characteristics for the first two entries.

Helicopter, cable, shovel and tractor yarding systems may be used. On helicopter, shovel, or tractor yarding units, there will be more flexibility on the position and the shape of the patches. The patches will be designed to minimize windthrow. On units which are to be cable-logged, the distribution and arrangement of the patches will be limited due to the capabilities of the logging equipment and road locations. Cable-logged harvest units will be in narrow strips generally less than two acres in size. Leave strips will remain between the harvest openings.

As in the clearcutting with reserves prescription, each group of trees will be monitored to ensure adequate restocking of all species to maintain species diversity. Approximately twenty years following harvest, the patches should be considered for potential thinning. Multiple thinnings may be necessary to maintain understory vegetation and develop a multi-storied canopy.

## **Single-Tree Selection - Uneven-aged management**

Within all single-tree selection units except Unit 15, 20 percent of the trees would be removed in each entry at 40-year cutting cycles by individually selecting trees. The rotation will be extended beyond the average rotation age (90 to 120 years) to 200 years. Because of the difficulty of removing individual trees, this prescription can be used with shovel and helicopter yarding. This prescription harvests timber and maximizes old-growth structural diversity.

Due to the relatively small openings created by single-tree selection, regeneration and individual tree growth will be somewhat suppressed. Regeneration will be closely monitored to ensure the cedar component is maintained through the next rotation. It is unlikely that thinning will be required in single-tree selection stands.

Single tree selection Units 12 and 15 are proposed for an after harvest study of deer and moose winter use. Unit 12 will harvest 20 percent of the trees with adjacent used as a no-harvest control. Unit 15 will be divided into four sections. One fourth of the unit will be established as a control and will not have any timber harvest. The other part will be divided into three sections and harvested at 20, 40, and 60 percent removal of the trees respectively.

The primary objective is to study the effects of varying intensities of single tree harvest on moose and deer winter use of the stand. This is an expansion of the administrative study in another stand within the project area where 20 and 40 percent of the trees was removed to study ungulate use. Subsequent entries will be contingent upon the results of the study. For example, if 40 percent removal appears to be the optimal habitat, future management strategies for the sub-units with 20 percent and 60 percent removal will be modified to emulate the 40 percent strategy. Shovel-yarders or tractors harvest will be used.

# Timber Management and Economics

## Thinning and Pruning

Currently about 28 percent of the tentatively suitable forested land is second-growth timber. These second growth stands have been surveyed and thinning and/or pruning is proposed in all alternatives. Second growth management will improve stand condition for future timber production and increase forage for moose and deer.

An intensive thinning program began in 1976. Stands were thinned at approximately 12 to 15 years. Many of these stands require a rethinning in order to maintain the understory component. Several of these stands have been rethinned. Some of the stands are beyond rethinning since there is very little or no residual understory.

To maintain the understory vegetation when the trees are larger than seven inches in diameter, pruning may be a viable alternative. Pruning may be done on highly productive sites to increase value of the trees and to increase indirect sunlight which increases forage production for wildlife. Pruning may extend the survival of browse until the trees can be removed commercially.

**Table 3- 1. Acres<sup>1</sup> and Volume<sup>2</sup> Proposed for Harvest in Million Board Feet (MMBF) by Silvicultural Prescription by Alternative**

| Silvicultural Prescription <sup>3</sup> | Alt. 1   |              | Alt. 2      |              | Alt. 3      |              | Alt. 5      |              | Alt. 6      |              |
|---|----------|--------------|-------------|--------------|-------------|--------------|-------------|--------------|-------------|--------------|
|   | Vol.     | Acres        | Vol.        | Acres        | Vol.        | Acres        | Vol.        | Acres        | Vol.        | Acres        |
| Clearcut with Reserves                  | 0        | 0            | 11.9        | 610          | 10.3        | 460          | 6.4         | 284          | 10.5        | 541          |
| Group Selection 40%                     | 0        | 0            | 0           | 0            | 0           | 0            | 2.1         | 103          | 0           | 0            |
| Group Selection 30%                     | 0        | 0            | 2.4         | 92           | 5.6         | 204          | 0.4         | 14           | 2.3         | 85           |
| Group Selection 10%                     | 0        | 0            | 0           | 0            | 0.4         | 13           | 0           | 0            | 0           | 0            |
| Single Tree Selection 20%               | 0        | 0            | 0.1         | 3            | 0.1         | 3            | 2.1         | 75           | 0.7         | 28           |
| Single Tree Selection (0-60%)           | 0        | 0            | 0.7         | 24           | 0           | 0            | 0.7         | 24           | 0.7         | 24           |
| <b>Total Harvested Volume/Acres</b>     | <b>0</b> | <b>0</b>     | <b>15.1</b> | <b>729</b>   | <b>16.4</b> | <b>680</b>   | <b>11.7</b> | <b>500</b>   | <b>14.2</b> | <b>678</b>   |
| <b>Total Unit Acres</b>                 |          | <b>0</b>     |             | <b>1,015</b> |             | <b>1,286</b> |             | <b>1,050</b> |             | <b>1,046</b> |
| <i>Thinning and Pruning</i>             |          | <i>1,600</i> |             | <i>1,600</i> |             | <i>1,600</i> |             | <i>1,600</i> |             | <i>1,600</i> |

<sup>1</sup> Harvested acres include total acres from clearcut with reserve trees units and the portions of the unit acreage harvested from the group selection and single-tree selection units.

<sup>2</sup> Volume was determined by using the unit acres and the average volume per acre as defined by volume strata class (see page 3-5).

<sup>3</sup> Percentages denote amount of stand removed.

## Tentatively Suitable Forest Land

Tentatively suitable forest, as defined by the Forest Plan Appendix A, includes productive forest that is physically suitable for timber harvest, can be adequately restocked in five years, and has been identified as suitable for timber management. Forested land within the designations: Timber Production, Modified Landscape, and Scenic Viewshed are considered available for timber management. Land on slopes greater than 72 percent, forested wetland soils identified in the Forest Plan Record of Decision, areas within riparian, beach, and estuary buffers are not considered suitable forest land. There are about 18,232 acres of tentatively suitable forest in the project area.



## Volume Strata

Timber volume is classified into three volume strata on the Tongass National Forest (Forest Plan EIS, pages 3-18 and 3-19), based on the size and number of trees an area is able to grow (timber volume). The Forest Plan had previously used volume class which was based on board feet per acre only. Volume strata uses volume class, slope, and whether a soil is hydric (wetland soils). Volume strata have been found to be more reliable than were the volume classes when data were statistically analyzed.

**High Volume Strata** - Areas within TIMTYP volume classes 5, 6, and 7 (over 20,000 board feet per acre) on non-hydric soils and on hydric soils on slopes greater than 55 percent.

**Medium Volume Strata** - Areas within TIMTYP volume classes 5, 6, and 7 on hydric soils with slopes less than or equal to 55 percent; areas within TIMTYP volume class 4 that are either on non-hydric soils, or are on hydric soils on slopes greater than 55 percent.

**Low Volume Strata** - Areas within TIMTYP volume class 4 (8,000 to 20,000 board feet per acre) on hydric soils with slopes less than or equal to 55 percent.

The total acres of each volume strata found within the project area on National Forest land and harvested in each alternative are given in Table 3-2 and 3-3, respectively.

**Table 3- 2. Acres by Volume Strata from National Forest Lands Within the Project Area**

|                | Average MBF/Acre <sup>1</sup> | Average MCF/Acre <sup>1</sup> | Productive Forest | Tentatively Suitable Forest |
|----------------|-------------------------------|-------------------------------|-------------------|-----------------------------|
| Managed Stands |                               |                               | 5,034             | 4,258 <sup>2</sup>          |
| Low Strata     | 16.9                          | 4.7                           | 3,326             | 1,138                       |
| Medium Strata  | 24.1                          | 6.1                           | 7,032             | 3,296                       |
| High Strata    | 29.3                          | 6.9                           | 14,244            | 9,540                       |

<sup>1</sup>From Forest Plan EIS, page 3-255, Stikine Area Forest Strata Characteristics.

<sup>2</sup> Some stands previously harvested are no longer suitable for harvest in the 1997 Forest Plan (e.g. beach and riparian buffer).

**Table 3- 3. Acres Proposed for Harvest<sup>1</sup> by Volume Strata**

|        | Alt. 1 | Alt. 2 | Alt. 3 | Alt. 5 | Alt. 6 |
|--------|--------|--------|--------|--------|--------|
| Low    | 0      | 165    | 25     | 30     | 137    |
| Medium | 0      | 179    | 129    | 65     | 180    |
| High   | 0      | 385    | 526    | 405    | 361    |

<sup>1</sup> Harvest acres include acres from clearcut with reserve trees and the percentages harvested from the group selection and single-tree selection acres. Some acres of non-forest or low-productive forest are within units.

## Irreversible and Irretrievable Commitment of Resources

The development of roads to access the timber would result in loss of productive forest land. Although this would not be an irreversible impact, the volume loss during the time that the roads are in place could not be replaced. Temporary roads take land out of timber production for approximately 10 years. Permanent roads would affect timber production on those sites indefinitely.

# Timber Management and Economics

## Timber Supply and Demand

The available supply of timber from the Tongass National Forest is based on the Allowable Sale Quantity (ASQ). The ASQ is based on the amount of wood growing on lands determined tentatively suitable by the Forest Plan. Growth rate, quality of wood, and species composition is also factored in when estimating the timber supply. ASQ is the average maximum amount of the timber that could be harvested per year. According to the Forest Plan ROD (page 8) the harvest level is 200 MMBF or less given current market conditions.

The market demand for Tongass National Forest timber is derived from complex factors including Southeast Alaska's timber industry mill capacity, international timber markets, and available and projected supplies locally, nationally, and world-wide. The most recent Brooks and Haynes report (September 1997) estimates the projected demand for Tongass National Forest timber for the years 1998-2002 to range from 96 MMBF to 130 MMBF. The lower projection is based on mills that were currently operating at the time and assumes that the product mix remains the same. Since this information was published, two sawmills have opened in southeast Alaska.

Demand for timber by Southeast Alaska manufacturers has recently been in a transition state since the termination of the two long-term contracts. More smaller operators are entering into the competition for timber and new products are being considered. A sustainable flow of raw material is essential for these operators to consider investments. Most state and privately owned timber is sold for higher values of the export market. This means that in-state timber manufacturers rely heavily on timber from the Tongass National Forest, which is subject to Alaska processing regulations (36 CFR 223.201).

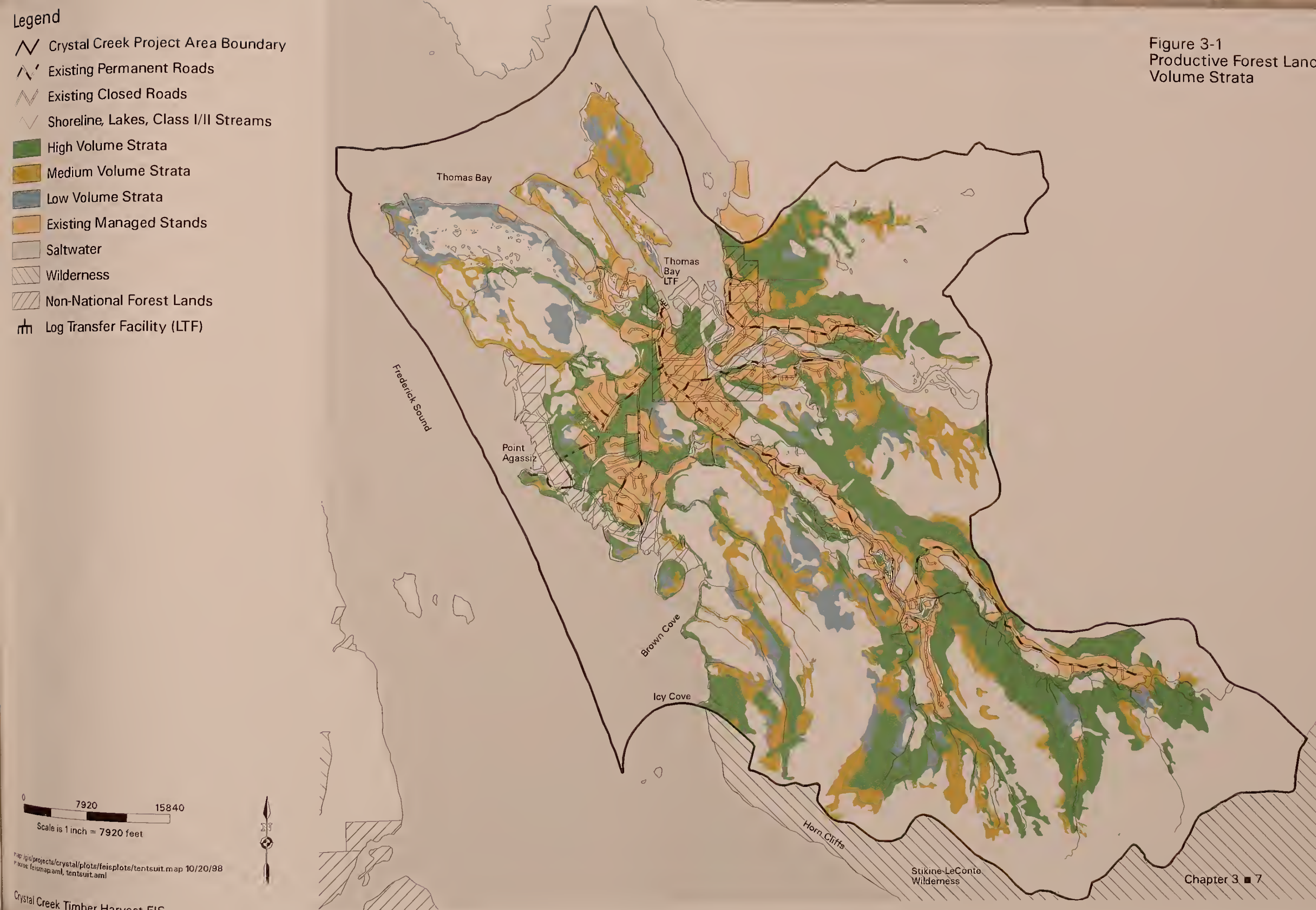
In order to create a consistent supply of timber, timber harvest planning needs to begin at least three years prior to the sale to ensure adequate time for field review and public participation during the environmental analysis process; field layout of units and roads if the decision to harvest timber in an area has been made, and to appraise the timber's value for advertisement. In summary, demand for timber cannot be perceived at one point in time, but rather examined over a period of time. A discussion of how the timber from the Crystal Creek Project Area is incorporated into the Tongass National Forest timber is found in "Reasons for Scheduling the Environmental Analysis of the Crystal Creek Timber Harvest" which is located in the planning record.

## Logging Operability

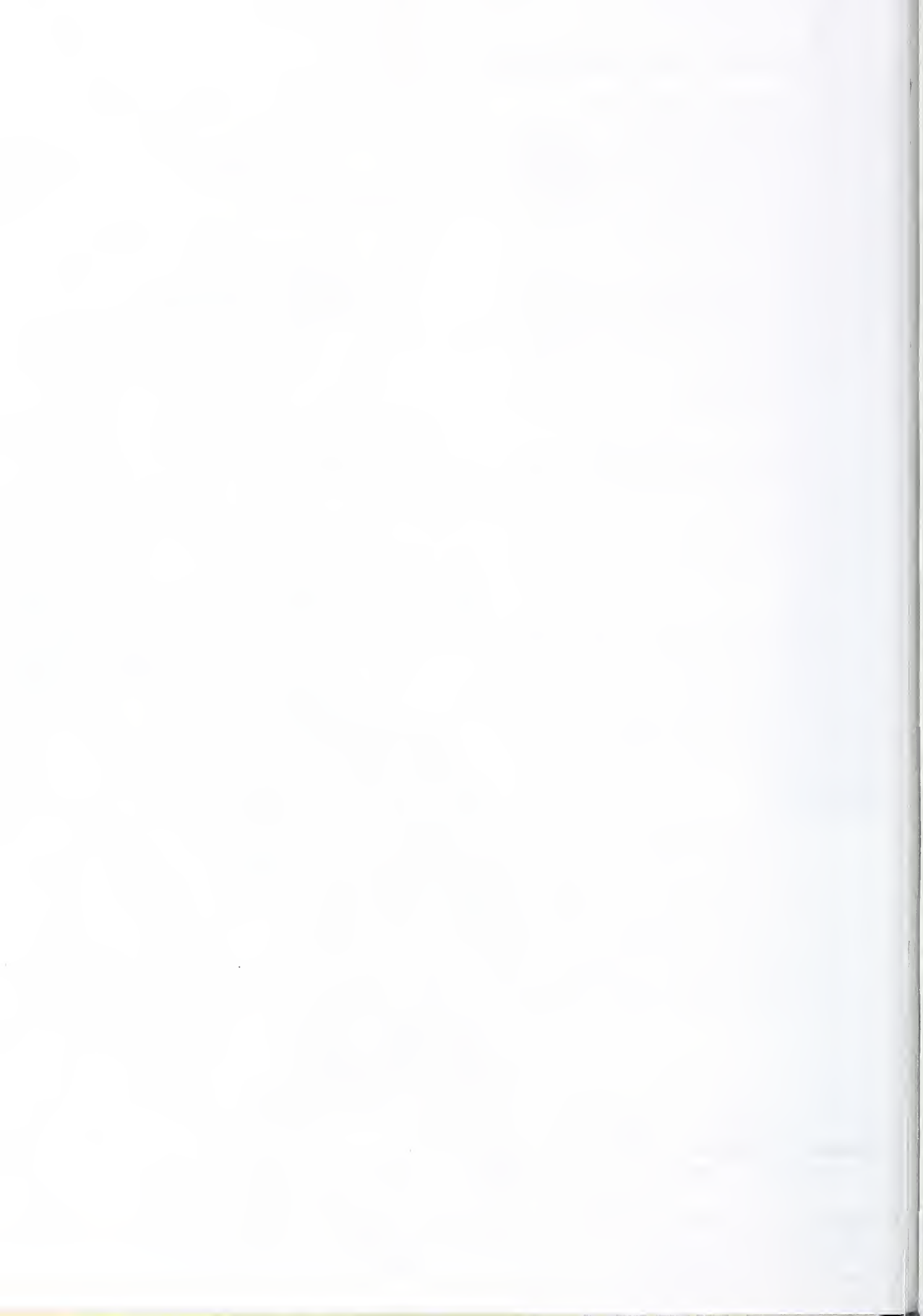
One factor that affects the economic analysis is the expense of logging the timber. The cost of logging is influenced by the silvicultural method chosen, the logging system used, and the amount of road needed to access the timber. Table 3-1 shows the amount of volume harvested by silvicultural method. Table 3-4 displays the acres and volumes harvested by logging system. Shovel logging is used where the land is relatively flat and adjacent to a road. Helicopter logging is used where road building is difficult. Helicopter units are generally within one mile of a road. All timber in the action alternatives is classed as Non-Interchangeable Component I (NIC I). NIC I refers to all timber on lands of normal operability. This includes shovel yarding, tractor logging, standard cable logging, such as highlead, slackline, and running skyline, and standard helicopter yarding with distances up to three quarters of a mile.



Figure 3-1  
Productive Forest Land  
Volume Strata







**Table 3- 4. Acres and Volume in Million Board Feet Harvested by Logging System<sup>1</sup>**

| Logging System | Alt. 1 |       | Alt. 2 |       | Alt. 3 |       | Alt. 5 |       | Alt. 6 |       |
|----------------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|
|                | Vol.   | Acres | Vol.   | Acres | Vol.   | Acres | Vol.   | Acres | Vol.   | Acres |
| Shovel         | 0      | 0     | 3.6    | 256   | 0.1    | 14    | 7.5    | 651   | 3.7    | 345   |
| Cable          | 0      | 0     | 11.5   | 524   | 11.2   | 489   | 4.3    | 189   | 10.5   | 483   |
| Helicopter     | 0      | 0     | 0      | 0     | 5.1    | 188   | 0      | 0     | 0      | 0     |

<sup>1</sup> Total unit acres are counted in clearcut with reserve and single-tree selection harvest. Only those acres harvested are counted in the group selection units.

## Forest Service Costs

### Sale Preparation

Unit layout and cruising costs rise significantly when silvicultural prescriptions require marking of cut and/or leave trees. The Regional average for sale preparation costs rose from \$18.25/mbf to \$52.00/mbf from 1992 to 1996 (USDA-FS, 1992/1996b). This rise was in part due to the use of silviculture systems other than clearcutting. The Alternatives-to-Clearcutting Research Study required about eight times more person-days to do an individual tree marked unit versus a clearcut unit, according to the layout forester (Personal communication with R. D. Parks).

Accessibility to the units is a major cost factor. Helicopter access and steeper terrain increase sale preparation costs over areas with existing road access.

Using these criteria, Alternative 5 will be the least costly to prepare in spite of the individual tree marking involved because of the easy access from existing roads. Alternatives 2 and 6 will have costs higher than Alternative 5, because the Ess Lake and Crystal Creek units can be reached only by walking longer distances from existing roads or by helicopter even though units are mostly clearcut with reserves. Alternative 3 would be the most expensive to prepare because of inaccessible units and the large amount of group selection harvest.

### Sale Administration

Sale administration costs are higher when helicopter logging is involved because of the difficulty of checking the timber harvest for compliance. Scattered and smaller group openings make it harder to ensure that all the groups are cut. For this reason, the sale administration costs will be higher for Alternative 3 than the other action alternatives.

## Economic Comparison of Alternatives

Alternative 1 - This alternative would not harvest any timber or have any road construction or reconstruction. Alternative 1 would provide no economic value and provide no return to the U. S. Treasury.

All action alternatives showed a negative appraised net value using the Region 10 residual value appraisal system. Although the net stumpage value is a negative value, the sales will be advertised at base rates. Depending on the market, the sales may be sold at a much higher value. Recent sales have sold for more than the advertised value.

Alternative 2 - This alternative ranks last in relative economic ranking. This alternative has the highest road costs, because it builds the most roads and includes a bridge crossing of the Muddy River. It contains the most acres to be harvested using the clearcut with reserve tree prescription (approximately 15 percent of the trees left). Most of these units are within the lower volume stands in order to maximize forage production and minimize the

# Timber Management and Economics

loss of higher volume stands for winter range. The higher volume stands to be harvested would be group selection with a 30 percent removal of the trees. These units are designed for cable, tractor, or shovel logging.

Alternative 3 - This alternative ranks third in relative economic ranking. Two bridge crossings of the Muddy River are planned for this alternative with slightly less road being built than in Alternative 2. About one-third of the volume is planned for helicopter logging, mostly with a 30 percent group selection removal of the stand volume. The rest of the logging, except for 14 acres, will be cable yarded. None of the high-volume stands in the Thomas Bay/Point Agassiz are planned for harvest. This alternative harvests the most volume (16.4 MMBF).

Alternative 5 - This alternative has the highest relative economic ranking. No bridge will be required across the Muddy River with this alternative. The most prevalent yarding system will be shovel logging using single-tree selection in the high volume stands next to the existing road system. The rest of units in this area will be clearcut with reserve trees. New roads will be built to access east of Ess Lake; group selection removing 40 percent of the stand volume will be cable logged. This alternative harvests the least amount of volume (about 11.8 MMBF).

Alternative 6 - This alternative ranks second in the relative economic ranking. This alternative is comparable to Alternative 2 in logging costs. However, less road will be built in Alternative 6. Several tractor or shovel-yarded units on the mainline road system improve the economics of this alternative.

## Opportunities for Offering Small Sales

The Assistant Forest Supervisor has the responsibility to decide which alternative or combination of alternatives to implement. Deciding how many sales and what sale size will be offered on a yearly basis is an administrative decision made after the Record of Decision is signed. This will be dependent on the current market and the demand for timber by various operators. To facilitate the development of competitive markets, the Forest Service and the Small Business Administration agree on an annual set-aside goal for the Tongass National Forest (Forest Plan EIS, page 3-291).

For the purpose of this discussion, a small sale is considered to be one million board feet or less with little or no roading. Unit 12, containing approximately 125 thousand board feet (MBF) that would be shovel logged and is accessible from the existing road, is a possibility for a small sale in all alternatives. Alternative 5, which uses the existing road system on the Point Agassiz Peninsula, would provide the greatest opportunity for small sales with a possible 7.5 MMBF that could be harvested with shovel logging. Alternative 2 could provide 1.9 MMBF for small operators within Units 7, 12, 15, 26, and 41. Alternative 6 could provide small sale opportunities in Units 5, 7, 10, 11, 12, 15, and 26 which is approximately 2.3 MMBF. Future small sale opportunities may occur after a larger sale is sold and more road access is provided.



## Issue 2 - Moose Management

Moose were chosen as a project-level management indicator species to evaluate the effects of proposed alternatives because they are an important subsistence species within the project area, are sensitive to the loss of understory shrub and forb forage in young forest stands (e.g., clearcuts), and prefer a habitat mosaic containing both young and old forests. The moose has been a species of concern within the project area since the early 1970's. Extensive clearcut logging in the Patterson and Muddy River drainages from 1956-1976 created openings which attracted moose. Hunters use logging roads to access moose hunting areas.

In 1978, the Forest Service, in cooperation with the Alaska Department of Fish and Game, initiated a radio telemetry study of moose in the Thomas Bay area. This study was designed to learn more about their habitat needs and to develop a habitat management plan that would attempt to promote and sustain the moose population over time. The telemetry study (Doerr 1983) suggested that moose preferred the glacial riverwash shrub stands along the Patterson River that contained high quantities of willows and cottonwoods. Clearcuts under 30 years of age were used more extensively than unlogged forests. Sitka spruce river terrace stands were preferred to western hemlock-spruce old growth, and forests on more productive sites were preferred to forests growing on less productive soils. Muskegs, estuaries, and ponds received little use.

Habitat use patterns were seasonal. Clearcuts were utilized most heavily in the spring, fall, and during winter months with low snowfall. During deep snow conditions (60 or more inches of snow in open areas), riparian shrub stands and high-volume coniferous stands were preferred and clearcuts were avoided.

Doerr (1984) suggested that, with precommercial thinning at a 12' by 12' spacing or wider, moose would use clearcuts as foraging areas at Thomas Bay to at least stand age 35. Subsequent observations at Thomas Bay support this assumption.

There has been little research done on moose use of even-aged second growth. However, loss of understory and low deer use has been documented for 25-year-old to 150-year-old unthinned second growth (Alaback 1982, Wallmo and Schoen 1980). It is assumed that loss of understory would also greatly diminish moose use of second growth.

A quantitative habitat suitability model (Doerr 1997a) was developed for moose within the project area based on habitat selection data from the telemetered relocations. This project-level model has not had formal peer review, but follows the general methodology used to develop forest-wide habitat models for other species (Suring 1993). One change was made in the moose habitat model as a result of comments to the DEIS. The habitat suitability value was reduced by 50 percent for older rethinned clearcuts. This change was based on concerns expressed by the Alaska Department of Fish and Game regarding the value of these older clearcuts for deer (Shea, 1997).

Moose populations increase in response to greater browse production in young second-growth forests. Severe winters are responsible for periodic die-offs of moose. Therefore, both clearcuts with high forage production and forested cover are important for moose. The qualitative moose habitat management model (Doerr, 1984) seeks to sustain an equal ratio of forested winter range to second-growth with high forage production throughout the timber rotation.

Some respondents to the DEIS expressed reservations about the qualitative model. We used the qualitative model because it is a useful way to systematically compare alternatives. The model indicates:

- if there is sufficient forest maintained as winter habitat,

- what harvest schedule would sustain young forest habitat throughout the rotation, and
- the benefit of second-growth management, such as Thinning and/or pruning, to maintain forage production.

Because Thomas Bay moose appear to be non-migratory with home ranges averaging 17 square miles (Doerr 1983), the high-forage and winter-range areas should be dispersed. The project area has been divided into four areas suitable for silvicultural management for moose. These areas are referred to as the Patterson, West Muddy, East Muddy, and Upper Muddy Moose Habitat Management Areas (Figure 3-2). A fifth area for potential moose habitat management is the State land surrounding the mouth of the Patterson River.

The large acreage of clearcuts created from 1956-76 is believed to be an important factor in the build-up of the herd and the current high population density of moose within the project area (LeResche et al, 1974 and Doerr, 1983). Approximately 3,500 acres of clearcut were precommercially thinned which prolonged the understory and helped maintain the moose population. Many of these units are now developing closed canopies and losing understory vegetation. Without additional thinning a noticeable decline in the moose population would be expected to occur by year 2010 as 4000 to 5000 acres of formerly high-value moose foraging habitat are lost. A rapid loss of forage is beginning in the West Muddy, Patterson, and East Muddy Moose Habitat Management Areas and on State land. Forage loss is not expected to be significant in the Upper Muddy Moose Habitat Management Area until sometime after Year 2005 because logging did not occur until the 1970's, and the clearcuts have been more recently precommercially thinned.

One way to maintain high forage in existing clearcuts is to thin again before understory is lost at stand age of about 30 to 40 years. To date, about 750 acres of older clearcuts in the West Muddy Moose Habitat Management Area have been rethinned, some in combination with pruning. In addition, the Alaska Department of Fish and Game plans to thin about 350 acres of clearcuts on State land. Observations of rethinned and pruned clearcuts indicate that the treatments can maintain understory production and moose use of the clearcuts for about 20 years to stand age 50 to 60 years. However, if the thinning is done after most of the trees reach about eight inches or more in diameter, slash may impede deer and moose movement in the stand for some time. Commercial thinning, which would remove the trees for commercial use, would reduce slash accumulations. Currently the trees in the existing second growth are not large enough to be economically thinned for commercial use. Commercial thinning of 50 years and older second growth could benefit moose and other wildlife beyond the effects shown in the wildlife models, if such logging is economically viable in the future.

## Environmental Impacts

Both the qualitative and a quantitative model were used to display the effects of the alternatives on moose habitat. The qualitative model was useful in evaluating how well the alternatives addressed sustaining a habitat mixture of winter range and high forage regrowth over the entire timber rotation and beyond. The quantitative model evaluated changes in moose habitat potential during the next forty years.

### Maintaining a Habitat Mosaic for Moose

For the purposes of maintaining a habitat mosaic for moose, it was necessary to determine the average age of timber harvest rotation in each moose habitat management Area and to determine the average percent of the rotation that a harvested stand will provide high understory forage production (Doerr 1984). In the qualitative model, we assumed that the normal timber harvest rotation was 110 years and that portions of the Ess Lake area would require a 165-year rotation for visual reasons. We envisioned a future scenario that assumed half of the second growth stands would be intensively treated for prolonged forage production. These treatments were assumed to extend the timber rotation by 10 years. We assumed that high forage would be maintained in harvested openings for about

40 percent of the rotation in all areas, except for areas with extended rotations for visual management. In those areas, forage would be maintained for about 36 percent of the rotation. Table 3-5 shows the average harvest rotation, acres of winter range needed at the end of the rotation, amount of forest to be harvested per decade to the end of the rotation, and estimated acreage of existing regrowth that will require treatment by year 2010 to maintain forage production for moose, as predicted by the qualitative model.

One of the outputs of the qualitative model was the identification of the amount of winter moose habitat needed to maintain an equal ratio of winter range to high forage regrowth at the end of the rotation within each moose habitat management area (Table 3-5). We compared this requirement with the amount of winter range protected from timber harvest by the Old-growth Habitat reserves shown in Alternatives 2 and 5, by riparian and beach buffers, and by other considerations (Table 3-6). The comparison suggests that three of the moose habitat management areas, East Muddy, Patterson, and Upper Muddy, have sufficient winter habitat protected in areas not available for timber harvest. An additional 170 acres of moose winter habitat is needed in the West Muddy Moose Habitat Management Area. In Alternatives 3 and 6, this requirement is exceeded by the additions to the Point Agassiz Old-growth Habitat Reserve (Table 3-12). In Alternatives 2 and 5, the winter requirement can be met by managing some stands for single-tree selection harvest with a 200-year rotation (Table 3-5).

The qualitative moose model estimated how much forest could be harvested to maintain high forage regrowth habitat for moose (Table 3-5). Openings created by clearcutting or group selection are expected to provide forage for at least 30 years, longer if thinned periodically. We compared the 20-year harvest rate suggested by the model to the acreage of openings created by clearcutting and group selection in each moose habitat management area in each alternative (Table 3-7). A ranking of the alternatives by how well they provide a long-term mosaic of winter range to high-forage regrowth for moose is: Alternative 2 (best), Alternative 6, Alternative 5, Alternative 3, and Alternative 1 (worst). Alternative 2 was designed to be compatible with the qualitative moose model and follows a harvest schedule that would maintain high forage regrowth throughout the rotation in all four moose habitat management areas. Alternative 2 provides about 76 percent of the estimated timber harvest openings needed during the next 20 years. Alternative 5 provides no additional high forage regrowth in the East Muddy Moose Habitat Management Area. Alternative 3 provides no new high forage regrowth habitat in the West Muddy Moose Habitat Management Area. Alternative 3 also creates more openings than are needed in the Upper Muddy Moose Habitat Management Area which could make it difficult to maintain forage in the later stages of the rotation. Alternative 1 does not use timber harvest to promote forage for moose in any of the moose habitat management areas.

This analysis suggests that, in the future, moose are more likely to be limited by the amount of forage production in young forest rather than winter habitat. Many respondents to the DEIS felt that a timber harvest scenario based on the qualitative moose model overemphasized moose at the expense of other species that use old growth. To respond to this, Alternative 6 was designed to maintain more high-volume old growth in the West Muddy Moose Habitat Management Area and old growth at the headwaters of Crystal Creek than Alternative 2, while still using timber harvest to create young forest habitat with high forage production. Alternative 6 provides about 67 percent of the new timber harvest openings suggested by the moose model for the next 20 years.

Approximately 1600 acres of existing second-growth stands will need silvicultural treatment during the next 10-15 years to maintain forage production. These acres have been included in all alternatives. Prolonging understory in existing second growth is a crucial part of managing moose habitat (Table 3-5). About 765 acres have been recently thinned within the planning area. This is in addition to the 1600 acres included in the alternatives.



It seems likely that we will meet or exceed the qualitative model's expected treatment needs through 2010 for all areas, except the East Muddy Moose Habitat Management Area. In that area we only identified about 590 acres of potential thinning compared to the model's suggested 650 acres. About 1,300 acres of clearcuts in the East Muddy Area were deemed unsuitable for silvicultural treatments because of one or more of the following factors:

- 1) the units have regenerated into red alder stands that do not produce desirable understory forage for moose;
- 2) Funds may not be available to conduct thinning in riparian areas where past logging occurred; and
- 3) some clearcuts have regenerated into dense-canopy conifer stands that have little understory production.

In all alternatives the relative availability of high-forage regrowth will decline in the East Muddy Moose Habitat Management Area and probably result in a slight decline in number of moose.

**Table 3- 5. Amount of Harvest and Thinning Needed to Maintain a Balance Between Forage and Winter Habitat for Moose as Identified by the Qualitative Model**

| Moose Habitat Management Area <sup>1</sup> | Average Harvest Rotation in Years | Acres of Winter Habitat Needed <sup>2</sup> | Acres of Timber Harvest Per Decade Under 1500' Elevation <sup>3</sup> | Acres Needing Thinning by 2010 |
|--|-----------------------------------|---|---|--------------------------------|
| West Muddy                                 | 115                               | 920   | 120   | 200                            |
| Patterson                                  | 130                               | 650   | 90  | 470                            |
| East Muddy                                 | 115                               | 1,480                                       | 220   | 650                            |
| Upper Muddy                                | 115                               | 570   | 80 <sup>4</sup>   | 400 <sup>4</sup>               |

<sup>1</sup>Refer to Figure 3-2 for the location of the moose habitat management areas.

<sup>2</sup> River-terrace forests, old-growth forests within the 1000' beach buffer, and inland old-growth forests, including forests that have been logged using single tree selection, that have at least 20,000 board feet/acre are assumed to provide for winter range for moose. The acreage shown only includes areas under 1500' elevation since a moose habitat model has not been developed for areas above 1500' elevation.

<sup>3</sup> Acres that can be harvested by clearcutting and group selection each decade from now until the end of the rotation.

<sup>4</sup>The qualitative moose model indicates that no timber harvest should occur in the Upper Muddy Moose Habitat Management Area until the existing clearcuts begin to lose understory, sometime after 2005. After 2005, about 80 acres timber harvest per decade plus about 400 acres of existing second-growth treatment will be needed to maintain high forage areas for moose.

**Table 3- 6. Moose Winter Habitat Needs**

| <b>Moose Habitat Management Area<sup>1</sup></b> | <b>Acres of Winter Habitat Needed<sup>2</sup></b> | <b>Acres of Winter Habitat Not Available for Timber Harvest<sup>3</sup></b> | <b>Additional Acres of Winter Habitat Needed for Moose</b> |
|--|---|---|--|
| West Muddy                                       | 920   | 750   | 170  |
| Patterson  | 650   | 730   | 0  |
| East Muddy                                       | 1,480   | 2,120   | 0  |
| Upper Muddy                                      | 570   | 710   | 0  |

<sup>1</sup> Refer to Figure 3-2 for the location of the moose habitat management areas.

<sup>2</sup> River-terrace forests, old-growth forests within the 1000' beach buffer, and inland old-growth forests, including forests that have been logged using single tree selection, that have at least 20,000 board feet/acre are assumed to provide for winter range for moose. Only forests under 1500' elevation are assumed to provide winter habitat for moose during deep snow conditions.

<sup>3</sup> Acreage shown includes the old-growth reserves as identified in the Forest Plan with boundary adjustments by the IDT (see Alt. 2 and 5 map).

**Table 3- 7. Comparisons Between the Moose Model 20-year Timber Harvest Rate and the Acres Harvested by Alternative**

| <b>Moose Management Area<sup>1</sup></b> | <b>Alt.</b> | <b>Twenty Year Harvest Rate Suggested by Model<sup>2</sup></b> | <b>Acres of Harvest Scheduled by Alternative<sup>2</sup></b> | <b>Percent of Model Suggested Harvest that is Proposed</b> |
|--|-------------|--|--|--|
| West Muddy                               | 1           | 230  | 0  | 0%   |
|  | 2           | 230  | 178  | 76%  |
|  | 3           | 230  | 0  | 0%   |
|  | 5           | 230  | 210  | 91%  |
|  | 6           | 230  | 141  | 61%  |
| Patterson                                | 1           | 180  | 0  | 0%   |
|  | 2           | 180  | 193  | 106%   |
|  | 3           | 180  | 176  | 94%  |
|  | 5           | 180  | 129  | 73%  |
|  | 6           | 180  | 213  | 118%   |
| East Muddy                               | 1           | 440  | 0  | 0%   |
|  | 2           | 440  | 298  | 68%  |
|  | 3           | 440  | 198  | 45%  |
|  | 5           | 440  | 0  | 14%  |
|  | 6           | 440  | 237  | 54%  |
| Upper Muddy                              | 1           | 80 <sup>3</sup>  | 0  | 0%   |
|  | 2           | 80 <sup>3</sup>  | 35   | 44%  |
|  | 3           | 80 <sup>3</sup>  | 212  | 265%   |
|  | 5           | 80 <sup>3</sup>  | 64   | 80%  |
|  | 6           | 80 <sup>3</sup>  | 35   | 44%  |

<sup>1</sup> Refer to Figure 3-2 for the location of the moose management habitat areas.

<sup>2</sup> Refers only to acres of openings created by clearcutting and group selection on forests under 1500' elevation.

<sup>3</sup> The qualitative model for moose indicates that no new timber harvest should occur in the Upper Muddy Moose Habitat Management Area until the existing clearcuts begin to lose understory. This is expected to occur sometime after 2005. After 2005, about 80 acres per decade are available for timber harvest.

### Changes in Moose Habitat Capability

A quantitative habitat suitability model (Doerr 1997a) was used to estimate the amount of change in moose carrying capacity as a result of each alternative. Moose carrying capacity is expressed as a percentage of the estimated 1954 capacity (Table 3-8). This model suggests that moose habitat capability was increased by 18 percent within the project area as a result of the logging that occurred from 1955-1976. Since 1980, the model suggests that the habitat quality has declined by 10 to 108 percent of its pre-logging value. This is the result of clearcuts closing in and losing understory. The model predicts that moose habitat potential would have been 13 percent lower today if about 3,400 acres of second growth had not been thinned from 1976-1996. Even with the second-growth treatment and the logging proposed in all action alternatives, the moose habitat potential is expected to decline by about 11 to 12 percent by 2010. Alternative 1 with thinning would result in a 15 percent decline in habitat quality by 2010.

**Table 3- 8. Estimated Changes in Moose Habitat Capability as a Result of Past and Proposed Future Logging and Thinning**

|                                    | Percent of Estimated 1954 Moose Habitat Capability |      |      |            |            |
|------------------------------------|--|------|------|------------|------------|
|                                    | 1954   | 1980 | 1997 | 2010       | 2020       |
|                                    |  |      |      | Cumulative | Cumulative |
| Alternative 1<br>without thinning* | 100%   | 118% | 108% | 93%<br>86  | 83%<br>79  |
| Alternative 2<br>without thinning* | 100  | 118  | 108  | 97<br>90   | 86<br>82   |
| Alternative 3<br>without thinning* | 100  | 118  | 108  | 96<br>89   | 85<br>81   |
| Alternative 5<br>without thinning* | 100  | 118  | 108  | 96<br>89   | 84<br>80   |
| Alternative 6<br>without thinning* | 100  | 118  | 108  | 97<br>90   | 86<br>82   |

\* Assumes no thinning of existing second-growth stands will occur after 1997 so the effects of proposed thinning on moose habitat can be displayed.



Legend











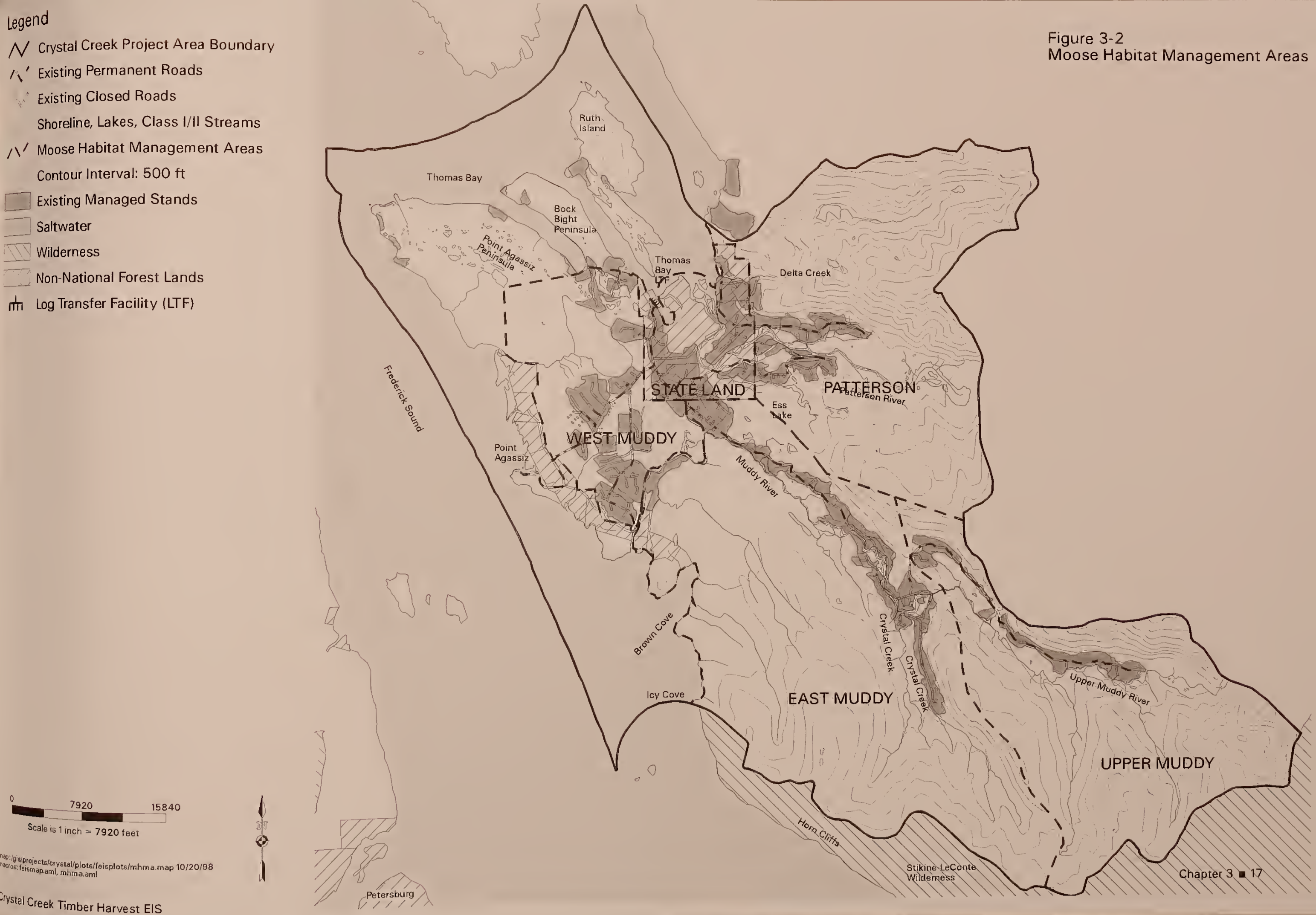
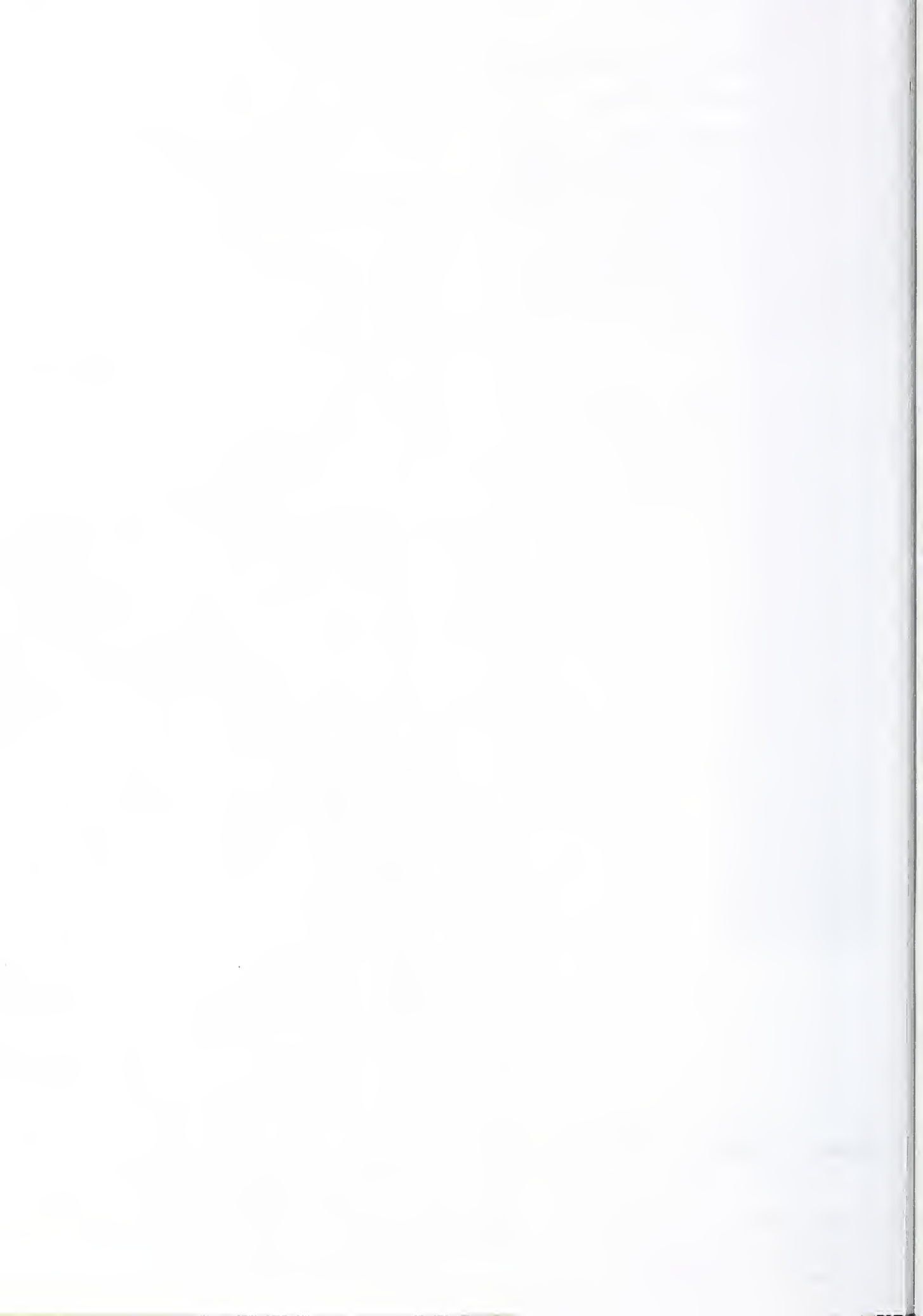
-  Crystal Creek Project Area Boundary
-  Existing Permanent Roads
-  Existing Closed Roads
-  Shoreline, Lakes, Class I/II Streams
-  Moose Habitat Management Areas
- Contour Interval: 500 ft
-  Existing Managed Stands
-  Saltwater
-  Wilderness
-  Non-National Forest Lands
-  Log Transfer Facility (LTF)

Figure 3-2  
Moose Habitat Management Areas



0 7920 15840  
Scale is 1 inch = 7920 feet

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macro:feismap.aml, mhma.aml



The quantitative model estimates that, without further logging and thinning, moose habitat capability will decline to 86 percent of the 1954 pre-logging value by year 2010 and to 79 percent by year 2020. The logging proposed in Alternatives 2 and 6 is estimated to increase moose habitat by about 4 percent for the next 30 years. The logging proposed in Alternatives 3 and 4 is estimated to increase moose habitat by about 3 percent for the next 30 years. The proposed second growth treatments, together with the thinning and/or pruning that has been done since 1997, will increase moose habitat capability by about 7 percent over the next 20 years.

Changes in moose habitat quality beyond year 2010 will depend on whether or not further logging and second-growth management are continued. The qualitative moose model assumed a sustainable habitat mosaic at the end of the harvest rotation comprised of 28 percent forested winter range (26 percent in Patterson Moose Habitat Management Area due to the extended rotation for scenery objectives), 28 percent logged openings with high forage production, and 44 percent older second growth on suitable forest lands. This habitat mosaic is estimated to be capable of sustaining more moose over the entire rotation than an entirely unlogged landscape. The feasibility of implementing such a mosaic will depend on scheduling timber harvest in each moose management habitat area over the entire rotation and treating second-growth stands to extend forage production.

Many respondents to the DEIS supported treating second growth, but opposed logging old growth to maintain a habitat condition for moose. Opposition to logging old growth centered on negative effects to other wildlife species and the perceived overemphasis of moose in the study area. Alternative 6 was developed to better address these concerns by modifying Alternative 2 to protect additional old-growth habitat within old-growth reserves while still maintaining opportunities to sustain dispersed early seral habitats for moose and provide timber harvest.

### **Single-tree Selection Harvest**

Single tree selection may have some benefits to moose if the logging substantially increases understory forage. At the present time, it is difficult to quantify what these effects would be. The amount of single tree-selection in the action alternatives ranges from 14 acres in Alternative 3 to 440 acres in Alternative 5. Alternatives 2, 5, and 6 contain two single-tree selection units (12 and 15) that are designed with unlogged control areas to further study the response of moose and other wildlife to this harvest method. Alternative 3 only contains Unit 12.



### Subsistence Use of Moose

The Crystal Creek Project Area is the most important moose hunting area for residents of Petersburg who take about 93 percent of the total harvest. The remaining seven percent of the harvest has been taken by residents of other Southeast Alaska communities, Anchorage, Fairbanks, Ninilchik, and outside of Alaska (Table 3-9).

The average yearly harvest from 1987-1996 was 19 bulls. Only bulls with spikes, forked antlers, three or more brow tines, or antlers 50 inches or more in width are currently legal. Special regulations also govern the use of motorized vehicles for moose hunting. The antler restrictions, along with the vehicle restrictions, are believed to be sufficient to prevent over-hunting of the Thomas Bay moose herd. Several hundred people hunt moose each year within the project area. Old logging roads are used for access to hunting areas and to transport moose out of the field. Several hunters expressed concern that additional roads and trails would negatively affect moose hunting by increasing competition. The areas of most concern were along the upper Patterson River and around Brown Cove Lake which are accessible by float plane. Other people expressed the concern that roads need to be maintained for access. The Alaska Department of Fish and Game Strategic Plan for managing moose at Thomas Bay from 1990-1994 (1991a) states that roads are important for access and help distribute the hunting pressure. The Alaska Department of Fish and Game plan further urges the Forest Service to maintain and restore roads and bridges to improve access for both consumptive and non-consumptive users. Recently, the Alaska Department of Fish and Game contracted the clearing of roads on State land near the head of Thomas Bay in order to improve access for hunters.

**Table 3- 9. Thomas Bay Area Moose Harvest by Community from 1987-1996\***

| Community                          | Average Harvest<br>(1987-1996) | Percent<br>Total Harvest |
|------------------------------------|--------------------------------|--------------------------|
| Subsistence Community <sup>1</sup> |                                |                          |
| Petersburg                         | 17.8                           | 93                       |
| Edna Bay                           | 0.2                            | 1                        |
| Sitka                              | 0.2                            | 1                        |
| Coffman Cove                       | 0.1                            | 0.5                      |
| Wrangell                           | 0.1                            | 0.5                      |
| Non-Subsistence Community          | 0.6                            | 3                        |
| Non-Resident                       | 0.1                            | 0.5                      |
| Total                              | 19.1 (9-26) <sup>2</sup>       | 100                      |

Source is unpublished Alaska Department of Fish and Game harvest data (Crain 1996).

<sup>1</sup> Communities listed as subsistence have been determined to have a subsistence priority for moose within the project area by the Federal Subsistence Board.

<sup>2</sup> Range of annual harvests is in the parenthesis.

# Legend

## MOOSE HABITAT CAPABILITY VALUES:

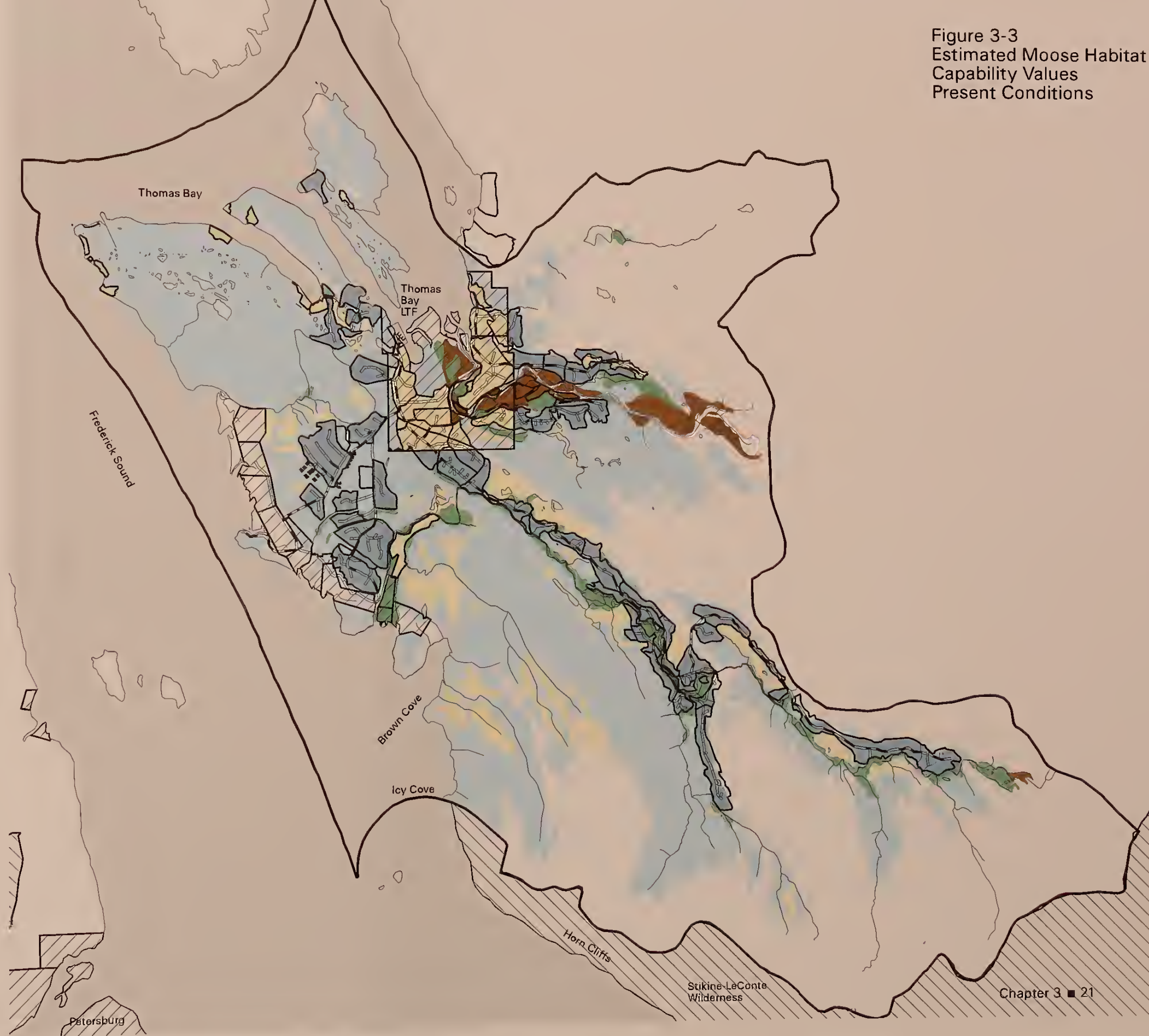
- 0.9 to 1.0 (Best Moose Habitat)
- 0.6 to 0.89
- 0.3 to 0.59
- 0.1 to 0.29
- 0.01 to 0.09 (Poor Moose Habitat)
- 0 (No Value)

- Saltwater
- Wilderness
- Non-National Forest Lands
- Log Transfer Facility (LTF)
- Existing Managed Stands
- Crystal Creek Project Area Boundary
- Existing Permanent Roads
- Existing Closed Roads
- Shoreline, Lakes, Class I/II Streams

Figure 3-3  
Estimated Moose Habitat  
Capability Values  
Present Conditions

0 7920 15840  
Scale is 1 inch = 7920 feet

map:/gis/projects/crystal/plots/feisplots/moose.map 10/21/98  
macros feismap.mxl, moose.mxl







### Changes in Moose Harvest

Under all alternatives, there may be a decline in the moose population and moose harvests during the next 10 to 15 years as some second-growth stands continue to lose understory (Table 3-10). The degree of decline in moose habitat quality depends on the amount of future timber harvest and the amount of second growth that can be treated to maintain understory. If no further logging occurs and there was no silvicultural treatment of existing second growth after 1997, it is expected that a 20 percent decline in moose habitat potential would occur by Year 2010. Given the proposed thinning, the decline in Alternative 1 would be about 14 percent. The action alternatives with thinning would have estimated declines in moose habitat capability ranging from 10 to 12 percent by 2010 (Table 3-10).

**Table 3- 10. Estimated Changes In Moose Habitat Capability and Moose Harvests Between 1997 and 2010**

|                                   | % Estimated 1954<br>Moose Habitat<br>Capability |      | Estimated Annual<br>Moose Harvest <sup>1</sup> | Estimated Change<br>in Annual Moose<br>Harvest |
|-----------------------------------|---|------|--|--|
|                                   | 1997  | 2010 | 2010   | 2010   |
| Alternative 1<br>without thinning | 108   | 93   | 16 (-14%)                                      | -3 moose                                       |
|                                   | 108   | 86   | 15 (-20%)                                      | -4 moose                                       |
| Alternative 2<br>without thinning | 108   | 97   | 17 (-10%)                                      | -2 moose                                       |
|                                   | 108   | 90   | 16 (-17%)                                      | -3 moose                                       |
| Alternative 3<br>without thinning | 108   | 96   | 17 (-11%)                                      | -2 moose                                       |
|                                   | 108   | 89   | 16 (-18%)                                      | -3 moose                                       |
| Alternative 5<br>without thinning | 108   | 96   | 17 (-11%)                                      | -2 moose                                       |
|                                   | 108   | 89   | 16 (-18%)                                      | -3 moose                                       |
| Alternative 6<br>without thinning | 108   | 97   | 17 (-10%)                                      | -2 moose                                       |
|                                   | 108   | 90   | 16 (-17%)                                      | -3 moose                                       |

<sup>1</sup> Estimated percent change in moose harvests from the present are given in parenthesis. A yearly average of 19 moose were taken from 1987-96 and it is assumed that moose harvests by 2010 will decline at the same rate as predicted moose habitat capability.

Annual moose harvests are expected to decline by about 2 to 3 moose per year by 2010 (Table 3-10). Both timber harvest proposed in the action alternatives and the treatment of existing second growth are projected to provide enough habitat to account for one additional moose in the annual harvest. Logging would maintain this additional moose habitat for about 30 years, while the effects of thinning are expected to last only about 20 years.

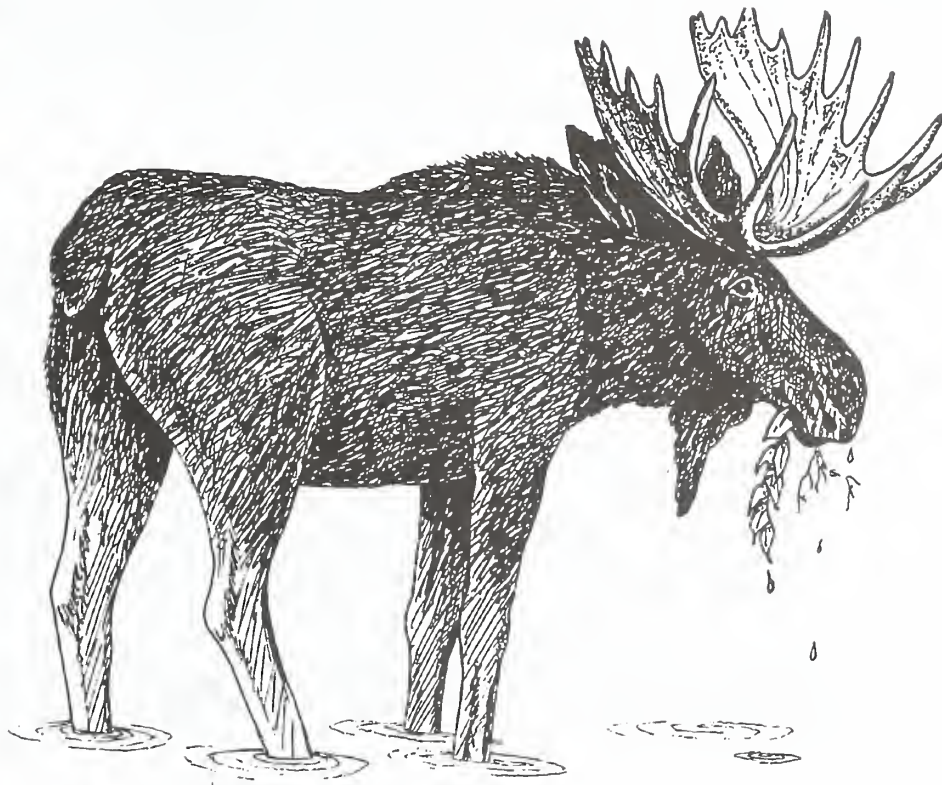
Moose habitat quality and harvests within the project area beyond 2010 will be influenced by future timber harvest and treatment of second growth. Assuming no further logging or thinning after 2010, moose harvests are expected to decline by five moose to an average annual harvest of about 14 moose in all alternatives by 2040.

## Changes in Access and Competition For Moose

Because moose are such a large animal and difficult to remove from the field, moose hunting is closely tied to areas near water transport, small plane access, or motorized road access. The IDT attempted to design the alternatives to keep motorized access for hunters as similar to the existing condition as practical. The motorized closure at the Muddy River bridge crossing will prohibit the use of motorized vehicles for moose hunting in the Crystal Creek drainage, both during and after the sale. Some increase in motorized access is expected in the Upper Muddy River area due to road reconstruction and rerouting in all action alternatives. Except for about 2.5 miles of road 44900 and road 6256, all other road construction is planned for closure after the sale. The closed roads will physically block motorized access, except for some all-terrain vehicles. A short-term increase in motorized access in the area surrounding Ess Lake will occur in all action alternatives, and a short-term increase in motorized access into a small portion of the Point Agassiz Peninsula will occur in Alternatives 2, 5, and 6. Alternative 3 will provide some short-term motorized access on the south side of the Upper Muddy River area.

There will be an increase in hiking access within the study area due to road construction. The locations of the proposed roads around Ess Lake will not greatly facilitate hiking access to the Patterson Glacier because of the terrain that lies between the roads and the glacier. Road construction will extend a road to within 0.6 miles of the southeast side of Brown Cove Lake in Alternatives 2, 3, and 6, which is similar to the distance that currently exists between on the lake and Road 6256 to the north. Construction of the bridge across the Muddy River will allow hunters to cross into the Crystal Creek drainage. However, the motorized closure will discourage moose hunting in the Crystal Creek drainage since animals will be difficult to remove from the field without vehicles. Furthermore, the immediate vicinity around Brown Cove Lake and the extensive area to the west of the lake were left in a natural setting to maintain a high quality hunting experience for hunters accessing the area with small planes or on foot from the beach.

Approximately 6.6 miles of existing temporary roads that are presently open will be closed (Appendix A). These roads did not have any sign of recent hunting and recreation use. These closures should have no adverse effect on access by subsistence hunters. The action alternatives are expected to have a slight increase in overall access within the project area. This increase in access is not expected to cause overhunting of moose because the "spike, fork, 50-inch antler" hunting restriction is thought to prevent over harvesting since only a segment of the bull population is legal for harvest. Similarly, no significant changes are expected in competition for moose among users in any of the action alternatives.





## Issue 3 - Biodiversity

The analysis of this issue focused on these aspects of biodiversity:

- 1) the maintenance of old-growth forest habitat,
- 2) the protection of the highest-volume timber stands; and
- 3) the effect of timber harvest on old-growth associated wildlife species.

The effects of the alternatives on Threatened, Endangered, and Sensitive Species are addressed in Other Environmental Considerations.

### Maintenance of Old-growth Habitat

Old-growth habitat will be maintained within the project area by:

1. Old-growth habitat not harvested through Forest Plan standards and guidelines (1000-foot beach and estuarine buffers and riparian buffers).
2. Old-growth Habitat reserve strategy; and the
3. Landscape connectivity corridor.

### Old-growth Habitat Maintained Through the Life of the Project

Currently there are about 24,600 acres of productive old growth within the project area on National Forest lands or about 83 percent of old-growth present in 1954 prior to the start of large-scale logging. This is nearly all of the productive old-growth in the project area. There are insignificant amounts of old-growth on State and private lands. About 10,000 acres of this old-growth is unsuitable or unavailable for timber harvest. These acres are within beach, estuary, and riparian buffers, on soils classed as unsuitable for harvest, or within non-development land use designations. The amount of productive old growth that will remain after each proposed alternative is shown in Table 3-11. Alternative 1 would not harvest any additional old growth. The action alternatives would remove 1.3 percent to 2.4 percent of the original 1954 old growth total using clearcut with reserves and group selection harvest methods. The use of group selection harvest methods would retain old forest stands with small openings of two acres or less.

**Table 3- 11. Estimated Acres of Productive Old Growth Remaining After Timber Harvest By Alternative On the Forest Service Lands Within the Crystal Creek Project Area.**

| Alternative | Acres of Productive Old Growth After <sup>1</sup> Proposed Timber Harvest | % of 1954 Total Productive Timber |                   |
|-------------|---|-----------------------------------|-------------------|
|             |   | Alternative Change                | Cumulative Change |
| 1           | 24,600  | 0                                 | 83                |
| 2           | 23,898  | 2.4                               | 80.6              |
| 3           | 23,923  | 2.3                               | 80.7              |
| 5           | 24,199  | 1.3                               | 81.7              |
| 6           | 23,974  | 2.1                               | 80.9              |

<sup>1</sup> Includes low, medium, and high volume strata.

## Old-growth Habitat Reserve Strategy

The Old-growth Habitat reserve system consists of a network of small, medium, and large Old-growth Habitat reserves and other non-development LUDs. Part of the Stikine-LeConte Wilderness to the south of the project area was identified as a medium Old-growth Habitat reserve and a medium Old-growth Habitat reserve borders Thomas Bay on the north side of the project area.

Within the project area, there are three small Old-growth Habitat reserves referred to as Point Agassiz, Brown Cove, and Delta Creek. These small Old-growth Habitat reserves were identified at the Forest Plan level but could be further evaluated for size, spacing, and habitat composition during project analysis (Forest Plan 3-82). The Forest Plan directs that small Old-growth Habitat reserves be 16 percent of the Forest Service acres within a VCU. Of this 16 percent, at least 50 percent shall be productive old-growth. Tables 3-12 and 3-13 display the total acres and acres of productive old-growth by VCU for the small Old-growth Habitat reserves in the Forest Plan. Productive old-growth includes all timber stands classed in either low, medium, or high volume strata.

**Table 3- 12. Comparison of Total Acres Between Forest Plan Criteria and Small Old-growth Habitat Reserves by VCU**

| VCU | Forest Plan Criteria <sup>1</sup> | Alt. 1 | Alt. 2             | Alt. 3              | Alt. 5             | Alt. 6             |
|-----|-----------------------------------|--------|--------------------|---------------------|--------------------|--------------------|
| 487 | 3,195                             | 2,790  | 4,100 <sup>2</sup> | 4,100 <sup>2</sup>  | 4,100 <sup>2</sup> | 4,100 <sup>2</sup> |
| 489 | 6,444                             | 7,000  | 7,390              | 10,440 <sup>3</sup> | 7,390              | 7,110              |

<sup>1</sup> Forest Plan Criteria from Appendix 1 of Appendix N of the Forest Plan FEIS.

<sup>2</sup> Includes non-development land use designation acres (890).

<sup>3</sup> Some acres of the Point Agassiz reserve (VCU 489) are actually within VCU 487 (Figure 3-6).

**Table 3- 13. Comparison of Acres of Productive Old-growth between minimum Forest Plan Criteria and Small Old-growth Habitat Reserves by VCU**

| VCU | Forest Plan Criteria <sup>1</sup> | Alt. 1 | Alt. 2             | Alt. 3             | Alt. 5             | Alt. 6             |
|-----|-----------------------------------|--------|--------------------|--------------------|--------------------|--------------------|
| 487 | 1,598                             | 1,680  | 2,340 <sup>2</sup> | 2,340 <sup>2</sup> | 2,340 <sup>2</sup> | 2,340 <sup>2</sup> |
| 489 | 3,222                             | 3,810  | 3,980              | 5,190 <sup>3</sup> | 3,980              | 4,040              |

<sup>1</sup> Forest Plan Criteria from Appendix 1 of Appendix N of the Forest Plan FEIS.

<sup>2</sup> Includes connected old-growth in adjacent non-development LUD (240 acres).

<sup>3</sup> Some acres of the Point Agassiz reserve (VCU 489) are actually within VCU 487 (Figure 3-6).

All three of the small Old-growth Habitat reserves were evaluated as part of project analysis. The Forest Plan design was incorporated as part of Alternative 1, the No-Action Alternative. One alternative design was developed for the Delta Creek Old-growth Habitat reserve, two alternative designs were developed for Brown Cove Old-growth Habitat reserve, and three designs were evaluated for the Point Agassiz Old-growth Habitat reserve.

## Comparison of Small Delta Creek Old-growth Habitat Reserve Old-growth Habitat Reserves Using the Forest Plan, Appendix K Criteria

### *Alternative 1 - Forest Plan Design*

The Delta Creek Old-growth Habitat reserve as designed by the Forest Plan does not meet the total acre size criteria in Appendix K. About 183 acres are within managed stands (early seral stages) and about two-thirds of a mile of permanent road is within the Old-growth Habitat reserve boundary.

### *Alternatives 2, 3, 5, and 6 - Crystal Creek Interdisciplinary Team Design*

An area of old-growth forest to the east on the slope above the Patterson River was added to meet the criteria. This provided a connection to a 240-acre block of old-growth within the Patterson River Special Interest Area. To further meet the criteria, existing clearcuts and an isolated portion across the Patterson River were avoided in the design.

**Table 3- 14. Delta Creek Old-growth Habitat Reserve**

| Forest Plan Appendix K Criteria                                       | Alternative 1 | Alternatives 2, 3, 5, and 6 <sup>1</sup> |
|---|---------------|--|
| Meets total size  | No            | Yes                                      |
| Meets productive old-growth acres                                     | Yes           | Yes                                      |
| Productive old-growth acres <sup>2</sup>                              | 1,680         | 2,340                                    |
| Interior old-growth acres   | 1,045         | 1,110                                    |
| Tentatively suitable forest acres                                     | 858           | 851                                      |
| Early seral habitat acres   | 183           | 0  |
| Permanent road miles  | 0.64          | 0  |
| Deer winter range <sup>3</sup> acres                                  | 229           | 292                                      |
| Known or suspected goshawk nesting habitat                            | None known    | None known                               |
| Known or suspected marbled murrelet nesting habitat                   | None known    | None known                               |
| One of the largest remaining contiguous old-growth block in watershed | yes           | yes                                      |
| Underrepresented plant associations                                   | None known    | None known                               |
| Acres of highest volume timber stands <sup>4</sup>                    | 29            | 23                                       |

<sup>1</sup> Includes part of the Special Interest Area.

<sup>2</sup> Productive old-growth includes all timber stands classed in either low, medium, or high volume strata.

<sup>3</sup> Habitat suitability index value  $\geq 0.3$ . A habitat suitability index of 1.0 is near the maximum theoretical winter density for deer.

<sup>4</sup> Timber stands with greater than 30,000 board feet/acre.



**Brown Cove Old-growth Habitat Reserve***Alternative 1 - Forest Plan Design*

This reserve, when combined with the Point Agassiz Old-growth Habitat reserve, meets the Forest Plan criteria for VCU 489.

*Alternatives 2 and 5 - Crystal Creek Interdisciplinary Team Design*

In order to make the Old-growth Habitat reserve more identifiable on the ground, the southeastern part of the boundary was moved to follow drainages. This change incorporated some higher volume stands on steep slopes into the Old-growth Habitat reserve. Some lower volume stands that were more accessible for timber harvest were removed from the Old-growth Habitat reserve.

*Alternatives 3 and 6 - U. S. Fish and Wildlife Service Design*

This design added a block of old-growth in the upper Crystal Creek drainage to maintain a larger wildlife travel corridor and make the Old-growth Habitat reserve more circular. The knoll to the northwest of Brown Cove was deleted since it was not connected with an old-growth stand.

Table 3- 15. Brown Cove Old-growth Habitat Reserve

| Forest Plan Appendix K Criteria                                       | Alternative 1                           | Alternatives 2 and 5                    | Alternatives 3 and 6                    |
|---|---|---|---|
| Meets total size  | Yes, when combined with Pt. Agassiz OGR | Yes, when combined with Pt. Agassiz OGR | Yes, when combined with Pt. Agassiz OGR |
| Meets productive old-growth acres                                     | Yes, when combined with Pt. Agassiz OGR | Yes, when combined with Pt. Agassiz OGR | Yes, when combined with Pt. Agassiz OGR |
| Productive old-growth acres <sup>1</sup>                              | 2,550                                   | 2,650                                   | 2,640                                   |
| Interior old-growth acres   | 1,264                                   | 1,204                                   | 1,354                                   |
| Tentatively suitable forest acres                                     | 2,021                                   | 1,976                                   | 2,393                                   |
| Early seral habitat acres   | 0                                       | 0                                       | 0                                       |
| Permanent road miles  | 0                                       | 0                                       | 0                                       |
| Deer winter range <sup>2</sup> acres                                  | 559                                     | 651                                     | 499                                     |
| Known or suspected goshawk nesting habitat                            | None known                              | None known                              | None known                              |
| Known or suspected marbled murrelet nesting habitat                   | None known                              | None known                              | None known                              |
| One of the largest remaining contiguous old-growth block in watershed | yes                                     | yes                                     | yes                                     |
| Underrepresented plant associations                                   | None known                              | None known                              | None known                              |
| Acres of highest volume timber stands <sup>3</sup>                    | 216                                     | 217                                     | 229                                     |

<sup>1</sup> Productive old-growth includes all timber stands classed in either low, medium, or high volume strata.

<sup>2</sup> Habitat suitability index value  $\geq 0.3$ . A habitat suitability index of 1.0 is near the maximum theoretical winter density for deer.

<sup>3</sup> Timber stands with greater than 30,000 board feet/acre.

## Point Agassiz Old-growth Habitat Reserve

### *Alternative 1 - Forest Plan Design*

This reserve, when combined with the Brown Cove Old-growth Habitat reserve meets the Forest Plan criteria for VCU 489. Minor acreage within managed stands (early seral stages) is included and about one-half mile of permanent road that accesses private land and the Point Agassiz beach access is within the Old-growth Habitat reserve boundary.

### *Alternatives 2 and 5 - Crystal Creek Interdisciplinary Team Design*

In order to make the Old-growth Habitat reserve more identifiable on the ground, minor changes were done to the southeastern part of the boundary to coincide with managed stand and private land boundaries. Some forested beach fringe was also added.

### *Alternative 3 - U. S. Fish and Wildlife Service and Alaska Department of Fish and Game*

This Old-growth Habitat reserve design doubled the size of the Forest Plan design to include most of the low elevation old-growth on the Point Agassiz Peninsula, which they felt needed protection to maintain diversity. This Old-growth Habitat reserve design includes 839 acres of early seral stands and three miles of permanent roads that are used to reach private land and the Point Agassiz beach access.

### *Alternative 6 - U. S. Fish and Wildlife Service, Alaska Department of Fish and Game, and Crystal Creek Interdisciplinary Team Design*

This design added some of the high volume stands on the Point Agassiz Peninsula and deleted some area of lower volume. An old-growth connection to the Muddy River was included in the Old-growth Habitat reserve. In order to make the Old-growth Habitat reserve more identifiable on the ground, managed stand and private land boundaries were followed.



Table 3- 16. Point Agassiz Old-growth Habitat Reserve

| Forest Plan<br>Appendix K Criteria                                    | Alternative 1                          | Alternatives 2 and 5                   | Alternative 3                          | Alternative 6                          |
|---|--|--|--|--|
| Meets total size  | Yes, when combined with Brown Cove OGR | Yes, when combined with Brown Cove OGR | Yes, when combined with Brown Cove OGR | Yes, when combined with Brown Cove OGR |
| Meets productive old-growth acres                                     | Yes, when combined with Brown Cove OGR | Yes, when combined with Brown Cove OGR | Yes, when combined with Brown Cove OGR | Yes, when combined with Brown Cove OGR |
| Productive old-growth acres <sup>1</sup>                              | 1,260                                  | 1,330                                  | 2,550                                  | 1,400                                  |
| Interior old-growth acres   | 251                                    | 259                                    | 538                                    | 412                                    |
| Tentatively suitable forest acres                                     | 555                                    | 563                                    | 2,506                                  | 861                                    |
| Early seral habitat acres   | 17                                     | 0                                      | 903                                    | 12                                     |
| Permanent road miles  | 0.33                                   | 0.33                                   | 2.3                                    | 0.5                                    |
| Deer winter range <sup>2</sup> acres                                  | 426                                    | 464                                    | 1,392                                  | 947                                    |
| Known or suspected goshawk nesting habitat                            | None known                             | None known                             | None known                             | None known                             |
| Known or suspected marbled murrelet nesting habitat                   | None known                             | None known                             | Suspected <sup>3</sup>                 | Suspected <sup>3</sup>                 |
| One of the largest remaining contiguous old-growth block in watershed | yes                                    | yes                                    | yes                                    | yes                                    |
| Underrepresented plant associations                                   | None known                             | None known                             | None known                             | None known                             |
| Acres of highest volume timber stands <sup>4</sup>                    | 135                                    | 142                                    | 879                                    | 276                                    |

<sup>1</sup> Productive old-growth includes all timber stands classed in either low, medium, or high volume strata.

<sup>2</sup> Habitat suitability index value  $\geq 0.3$ . A habitat suitability index of 1.0 is near the maximum theoretical winter density for deer.

<sup>3</sup> Based on surveys showing high level of activity and birds flying into the canopy.

<sup>4</sup> Timber stands with greater than 30,000 board feet/acre.

Legend















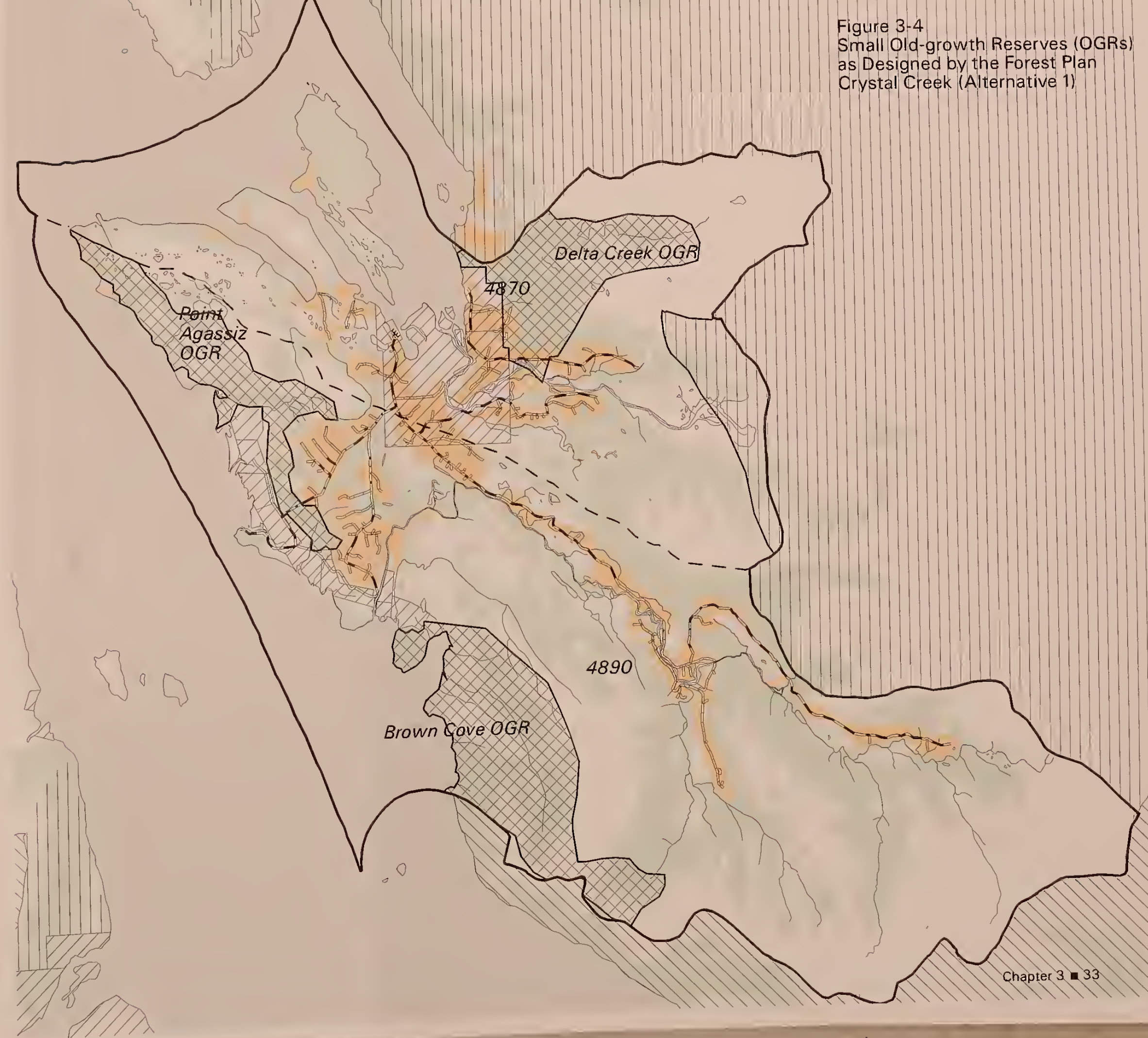
-  Crystal Creek Project Area Boundary
-  VCU Boundary
-  Existing Permanent Roads
-  Existing Closed Roads
-  Shoreline, Lakes, Class I/II Streams
-  Productive Old Growth
-  Existing Managed Stands
-  Saltwater
-  Wilderness
-  Non-National Forest Lands
-  Old Growth Reserves
-  Other Non-Development LUD
-  Connectivity Corridor
-  Log Transfer Facility (LTF)

Figure 3-4  
Small Old-growth Reserves (OGRs)  
as Designed by the Forest Plan  
Crystal Creek (Alternative 1)



0 7920 15840  
Scale is 1 inch = 7920 feet



map: g:\projects\crystal\plots\feisplots\ogr.map 10/20/98  
p:\crs\feis\mapaml, ogr.aml





# Legend















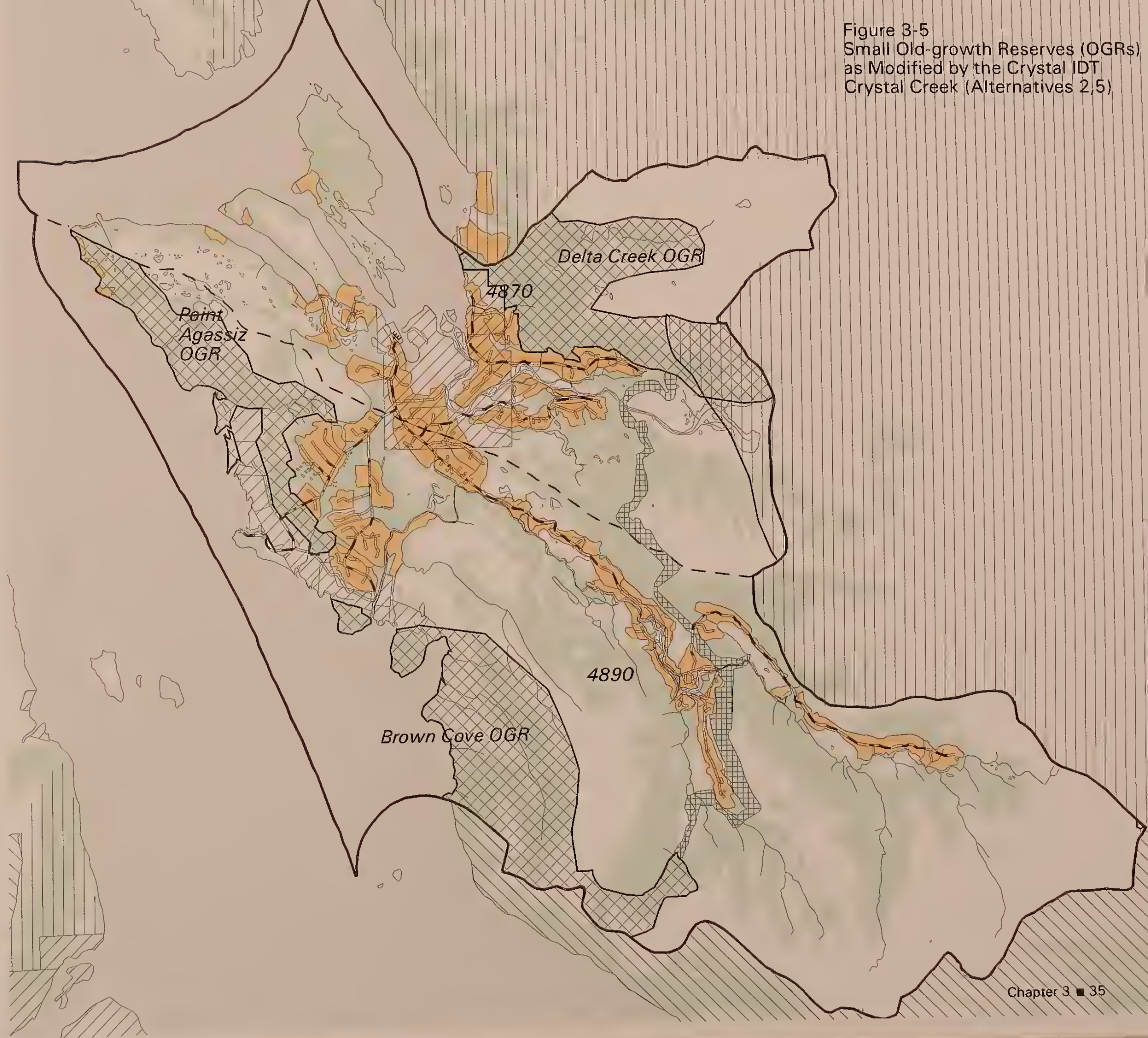
-  Crystal Creek Project Area Boundary
-  VCU Boundary
-  Existing Permanent Roads
-  Existing Closed Roads
-  Shoreline, Lakes, Class I/II Streams
-  Productive Old Growth
-  Existing Managed Stands
-  Saltwater
-  Wilderness
-  Non-National Forest Lands
-  Old Growth Reserves
-  Other Non-Development LUD
-  Connectivity Corridor
-  Log Transfer Facility (LTF)

Figure 3-5  
Small Old-growth Reserves (OGRs)  
as Modified by the Crystal IDT  
Crystal Creek (Alternatives 2,5)



0 7920 15840  
Scale is 1 inch = 7920 feet  
map: gis/projects/crystal/plots/feisplots/ogr\_idt.map 10/20/98  
macro: feismap.aml, ogr\_idt.aml





# Legend















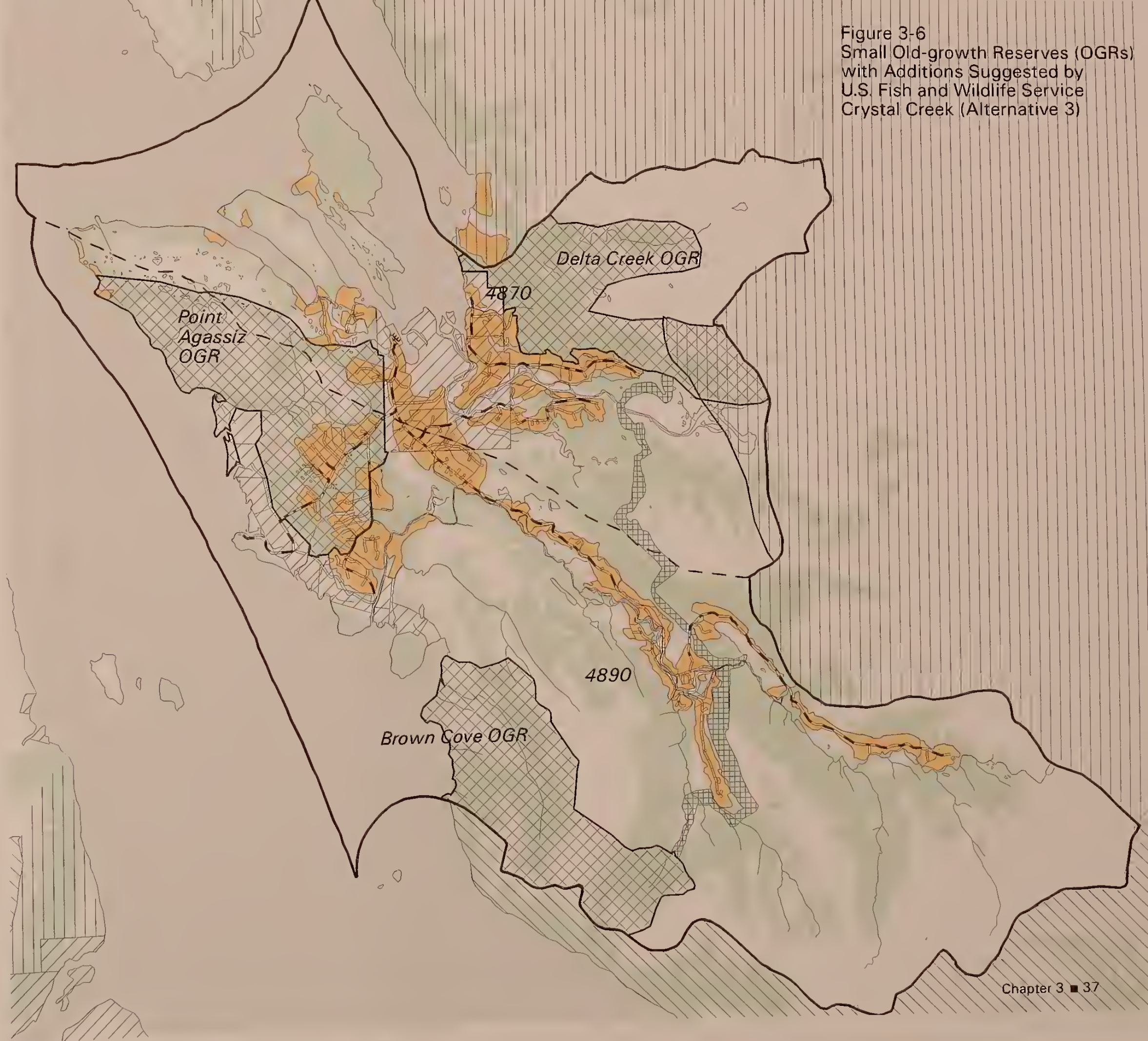
-  Crystal Creek Project Area Boundary
-  VCU Boundary
-  Existing Permanent Roads
-  Existing Closed Roads
-  Shoreline, Lakes, Class I/II Streams
-  Productive Old Growth
-  Existing Managed Stands
-  Saltwater
-  Wilderness
-  Non-National Forest Lands
-  Old Growth Reserves
-  Other Non-Development LUD
-  Connectivity Corridor
-  Log Transfer Facility (LTF)

Figure 3-6  
Small Old-growth Reserves (OGRs)  
with Additions Suggested by  
U.S. Fish and Wildlife Service  
Crystal Creek (Alternative 3)



0 7920 15840  
Scale is 1 inch = 7920 feet

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pacoe:feismap.mxd, ogr\_fws.mxd

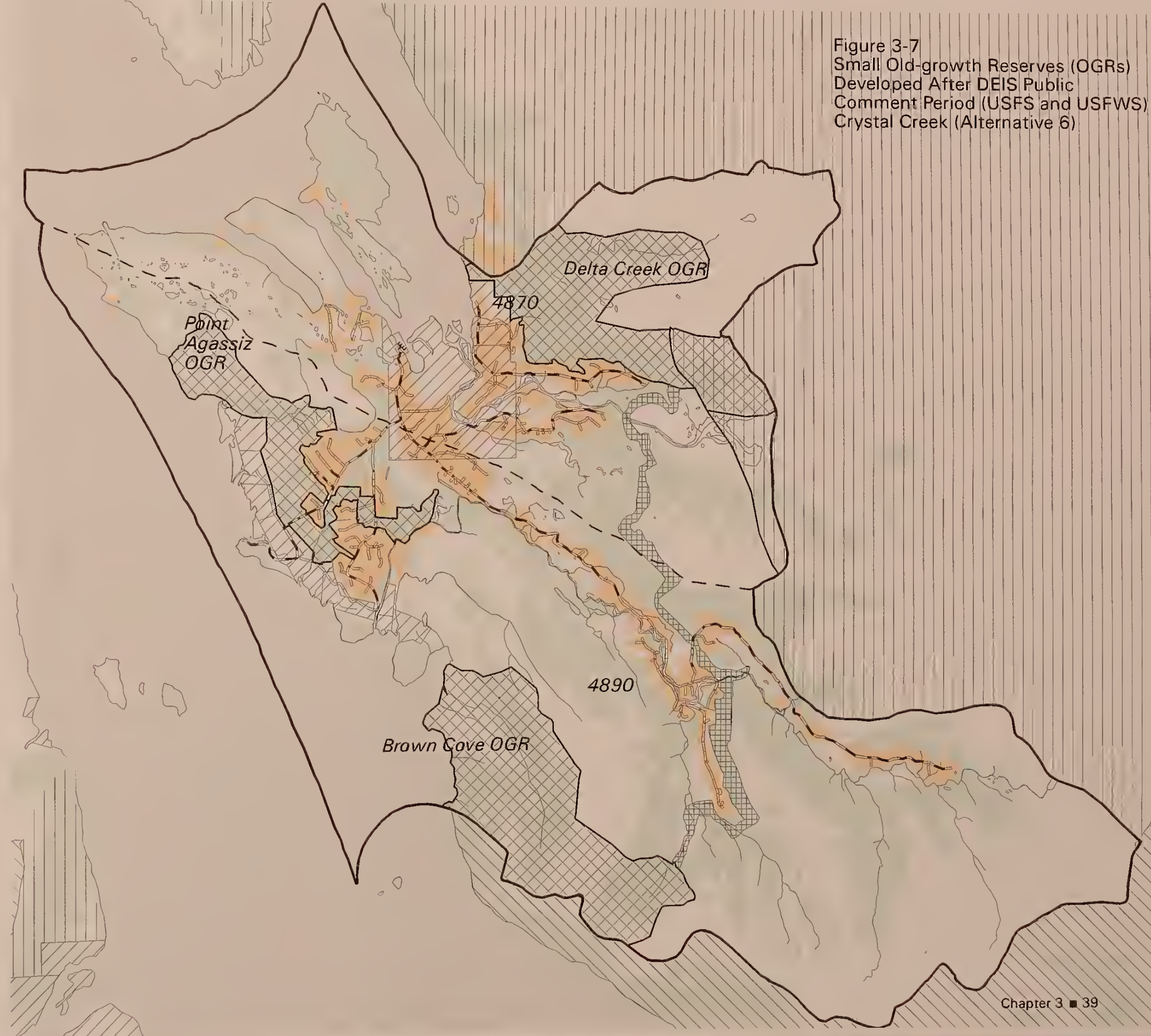




Legend

- Crystal Creek Project Area Boundary
- VCU Boundary
- Existing Permanent Roads
- Existing Closed Roads
- Shoreline, Lakes, Class I/II Streams
- Productive Old Growth
- Existing Managed Stands
- Saltwater
- Wilderness
- Non-National Forest Lands
- Old Growth Reserves
- Other Non-Development LUD
- Connectivity Corridor
- Log Transfer Facility (LTF)

Figure 3-7  
Small Old-growth Reserves (OGRs)  
Developed After DEIS Public  
Comment Period (USFS and USFWS)  
Crystal Creek (Alternative 6)



0 7920 15840  
Scale is 1 inch = 7920 feet

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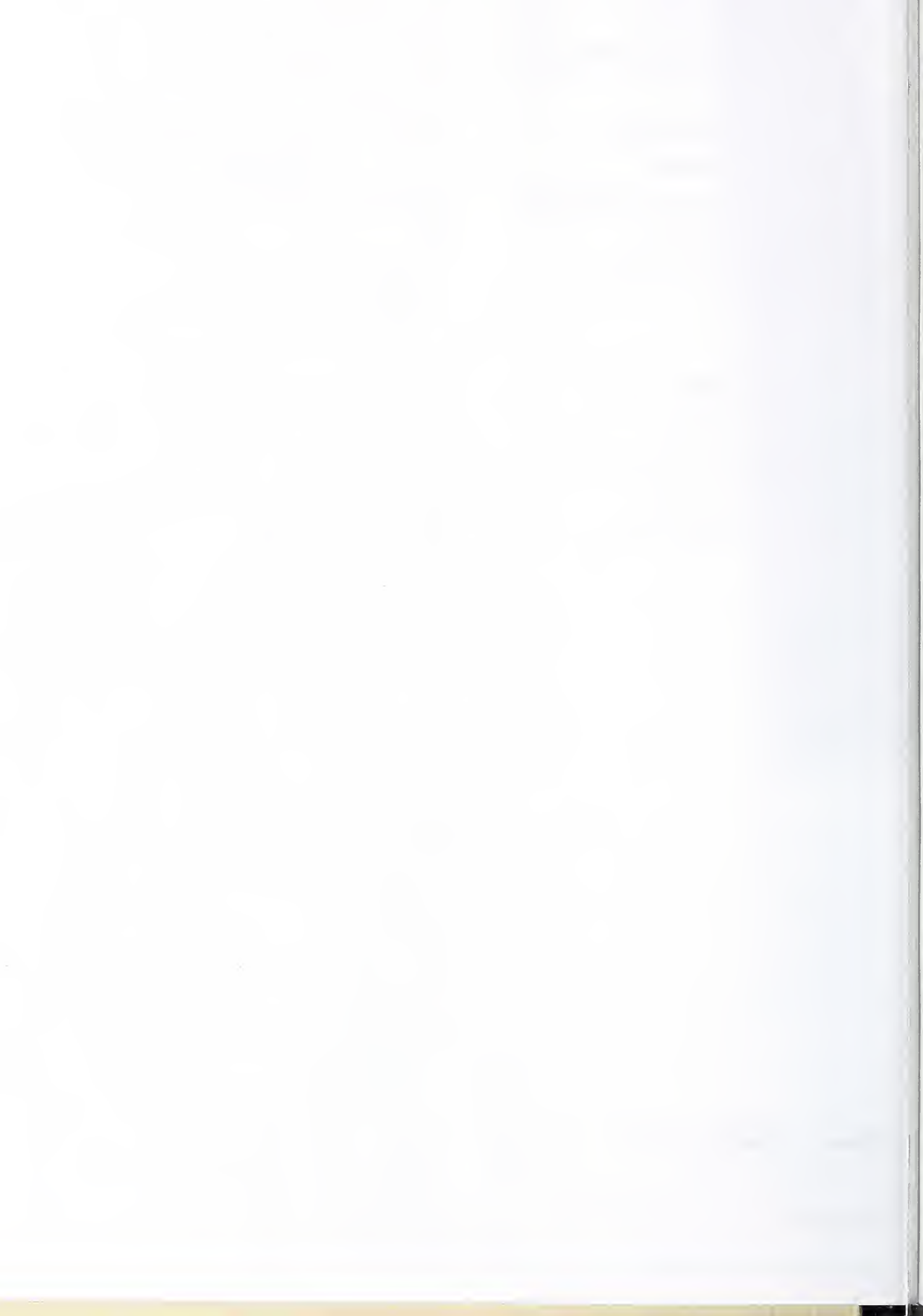




Table 3- 17. Acres in Small Reserves by VCU

| Old-growth Reserve                           | Productive Old-growth Acres | Total Acres        |
|--|-----------------------------|--------------------|
| <b>Delta Creek (VCU 487):</b>                |                             |                    |
| Forest Plan (Alt. 1)                         | 1,680                       | 2,790              |
| IDT Modification (Alt. 2, 3, 5, 6)           | 2,340 <sup>1</sup>          | 4,100 <sup>1</sup> |
| <b>Point Agassiz (VCU 489):</b>              |                             |                    |
| Forest Plan (Alt. 1)                         | 1,260                       | 2,350              |
| IDT Modification (Alt. 2, 5)                 | 1,330                       | 2,550              |
| FWS Recommendation (Alt. 3)                  | 2,550 <sup>2</sup>          | 5,600 <sup>2</sup> |
| IDT/FWS Recommendation (Alt. 6) <sup>3</sup> | 1,400                       | 2,270              |
| <b>Brown Cove (VCU 489)</b>                  |                             |                    |
| Forest Plan (Alt. 1)                         | 2,550                       | 4,650              |
| IDT Modification (Alt. 2, 5)                 | 2,650                       | 4,840              |
| FWS Recommendation (Alt. 3, 6)               | 2,640                       | 4,840              |

<sup>1</sup> Includes a portion of the adjoining Special Interest Area Land Use Designation.

<sup>2</sup> Some acres are within VCU 487.

<sup>3</sup> This recommendation was made during a joint meeting following the Draft Environmental Impact Statement.

Any modification to Land Use Designations including small changes to Old-growth Habitat LUD require an amendment to the Forest Plan. The amendment may be a significant change or a non-significant change, as determined by the Assistant Forest Supervisor (Forest Plan, page 5-3) in the Record of Decision for this project. Minor boundary adjustments such as those in Alternatives 2 and 5 are expected to be non-significant amendments to the Forest Plan. More substantial changes such as enlargement of Old-growth Habitat LUDs as in Alternative 3, may be a significant Forest Plan amendment, if they establish a precedence for modification of other small Old-growth Habitat reserves.

### Habitat Connectivity Between Reserves

Another aspect of the old-growth conservation strategy is to provide habitat connectivity between large and medium old-growth habitat reserves. Habitat connectivity refers to a continuous strip of older forest between each reserve so that species can readily travel between reserves. The older second growth within the project area, with trees 50 feet or taller, may also serve as a travel corridor for species that prefer forested cover. Habitat connectivity may allow the movement of some species, like northern flying squirrels, and is a desired condition of reserve design.

In all alternatives, there is limited habitat connectivity between the old-growth reserves due to the presence of the Muddy and Patterson Rivers and the previous harvest. There is an interruption in the old-growth corridor between the Point Agassiz and the Brown Cove reserves at the mouth of the Muddy River due to past logging, the presence of estuarine meadows, private land, and the Muddy River. Past logging and the presence of State land at the mouth of the Patterson River does not provide for an old-growth corridor between Bock Bight and Delta Creek or a direct connection between the Point Agassiz reserve and the Patterson River. Extensive logging along the Muddy River precludes an old-growth corridor through the lowlands of the Muddy River that would connect the Brown Cove reserve to the Patterson River. The presence of extensive logging, glacial outwash areas

dominated by shrubs, the Patterson River, and the Patterson Glacier all limit old-growth habitat connectivity across the Patterson River drainage.

In all action alternatives, an old-growth corridor was identified to connect the medium Old-growth Habitat reserve to the north of the study area with the medium Old-growth Habitat reserve (part of the Stikine/LeConte Wilderness area) to the south (Figures 3-4 to 3-7). The corridor included the most contiguous remaining old growth across the Patterson River drainage about 4.5 miles upstream of the mouth of the river. It also utilized riparian corridors and large blocks of forests on steeper slopes where available. The corridor was designed to include widths of at least 700 feet in some places to provide interior forest habitat.

## Protection of Highest-Volume Old-growth Forest Habitat

A concern expressed by members of the public, the U. S. Fish and Wildlife Service, and the Alaska Department of Fish and Game was the preservation of unlogged forest habitat in high volume stands, especially in the area between Point Agassiz and the Patterson River. This concern has centered around the fact that these stands have been extensively harvested in the past and that old growth forests with large diameter trees and large crown, multi-layered canopies are a unique and valuable component of biodiversity.

People who expressed concern for these stands, usually referred to them as volume Class 6 and 7 from the original Tongass Land Management Plan. Analysis done as part of the Forest Plan has shown that volume classes are a poor statistical predictor of timber volume. The Forest Plan identifies three “volume strata” that are statistically distinguishable with regard to timber volume. However, additional analysis has shown that the original Forest Plan TIMTYP Volume Classes 6 and 7 are probably the best indicators available for identifying forests with large diameter trees and large-tree canopies (Forest Plan FEIS, page N-24). Consequently, the Crystal Creek analysis used TIMTYP Volume Class 6+, with adjustments from field data and photo interpretation, to represent large-diameter, large-crown, gap-phased old growth. This classification is used to evaluate the concern over the protection of “high-volume old growth.”

About 76 percent of the past logging occurred in Volume Class 6+ forests within the project area. About 63 percent of the high volume forests have been logged on state and federal lands. There are about 2,790 acres of unlogged Volume Class 6+ forests remaining on National Forest land within the project area and about 50 acres remaining on State land near the mouth of the Patterson River.

The amounts of Volume Class 6+ old growth that are protected in Old-growth Habitat reserves, included in the harvest alternatives and included in future timber available for harvest are shown in Table 3-18. There are some substantial differences among the alternatives with regard to the protection of the highest-volume forests. The amount of Volume Class 6+ old growth protected in old-growth reserves ranges from 400 acres in Alternatives 1, 2, and 5 to 820 acres in Alternative 6 to 1,125 acres in Alternative 3. The acres of Volume Class 6+ available for harvest ranges from 500 acres in Alternative 3 to 750 acres in Alternative 6 to 1,080 acres in Alternatives 1, 2, and 5.

**Table 3- 18. Amount of Volume Class 6+ Old-growth<sup>1</sup> by Alternative**

|   | Acres and Percent of 1954 Old-growth <sup>2</sup> |          |            |            |           |            |            |            |            |            |
|---|---|----------|------------|------------|-----------|------------|------------|------------|------------|------------|
|   | Alt. 1  |          | Alt. 2     |            | Alt. 3    |            | Alt. 5     |            | Alt. 6     |            |
|   | Acres   | %        | Acres      | %          | Acres     | %          | Acres      | %          | Acres      | %          |
| Volume Class 6+ old growth in designated reserves                   | 400   | 5        | 400        | 5          | 1,125     | 15         | 400        | 5          | 820        | 11         |
| Volume Class 6+ within proposed units <sup>3</sup>                  |   |          |            |            |           |            |            |            |            |            |
| Clearcut with reserves  | 0   | 0        | 25         | 0.3        | 0         | 0          | 111        | 1.4        | 1          | 0          |
| Group Selection   | 0   | 0        | 59         | 0.8        | 0         | 0          | 88         | 1.1        | 34         | 0.4        |
| Single-tree Selection   | 0   | 0        | 91         | 1.2        | 11        | 0.1        | 426        | 5.5        | 199        | 2.6        |
| <i>Total</i>  | <i>0</i>  | <i>0</i> | <i>175</i> | <i>2.3</i> | <i>11</i> | <i>0.1</i> | <i>625</i> | <i>8.0</i> | <i>234</i> | <i>3.0</i> |
| Volume Class 6+ left unlogged after proposed timber harvest         | 2,840   | 37       | 2,665      | 34         | 2,829     | 36         | 2,215      | 29         | 2,606      | 34         |
| Volume Class 6+ old growth tentatively suitable timber <sup>4</sup> | 1,080   | 14       | 1,080      | 14         | 500       | 6          | 1,080      | 14         | 750        | 10         |

<sup>1</sup> Volume Class 6+ Old Growth is older, unlogged forests with at least 30,000 board feet/acre, as identified in the TIMTYP Volume Class 6 and 7 with modifications from field inventory data.

<sup>2</sup> 1954 was chosen as the base year to represent the prelogging condition of the project area. The estimated amount of Volume Class 6+ in 1954 on State and federal lands was approximately, 7,750 acres.

<sup>3</sup> All acres represent total unit acres not harvested acres.

<sup>4</sup> These figures include acres designated for harvest in the alternatives. Acres not harvested in the Selected Alternative may be harvested in future timber sales.

The estimated amount of Volume Class 6+ old growth proposed for harvest in the action alternatives range from 11 acres in Alternative 3, to 546 acres in Alternative 5. The majority of the proposed timber harvest in the highest-volume forests would be single tree selection.

There are no known species that exclusively require these forests, but some species prefer this habitat. Of the management indicator species selected for this environmental analysis, the brown creeper is the most dependent on Volume Class 6+ old growth. Brown creepers represent bird species that require forests with large, old-age trees for winter habitat (Suring, 1993). Brown creepers feed by picking insects and other small invertebrates out of cracks in the trunks of trees. Large-diameter trees provide a greater abundance of food than smaller trees and provide large snags that are important as roosting sites. In Southeast Alaska, the highest densities of brown creepers are found in the old-growth forests that exceed 30,000 board feet/acre. Old-growth stands with less than 20,000 board feet/acre, clearcuts, second growth, deciduous forests, and non-forest vegetation do not provide suitable winter habitat for these birds. The model for brown creepers (ibid., 1993) suggests that its habitat has been reduced by 55.5 percent within the project area since 1954 (Table 3-19).



The model estimates that brown creeper carrying capacity will decline by about 0.4 percent in Alternative 6; 0.6 percent in Alternative 3; 0.8 percent in Alternative 2; and 1.8 percent in Alternative 5 (Table 3-19). No further decline in brown creeper habitat is expected in Alternative 1 (no-action). The greater decline in Alternative 5 relative to the other alternatives that harvest timber is due to the greater amount of clearcutting with reserves and group selection harvest in the higher-volume forests. Decreased clearcutting with reserves in Volume Class 6+ forests in Alternative 6 would reduce estimated impacts to brown creeper by 50 percent compared to Alternative 2. Overall, the cumulative reduction in brown creeper habitat ranges from 55.5 percent to 57.3 percent of the 1954 estimate of pre-logging habitat potential in the alternatives.

**Table 3- 19. Estimated Changes in Brown Creeper Carrying Capacity.**

|               | Estimated Brown Creeper Carrying Capacity Post-Sale (# of animals) | Percent Change     |                             |
|---------------|--|--------------------|-----------------------------|
|               |  | Alternative Change | Cumulative Change from 1954 |
| Alternative 1 | 607  | 0                  | -55.5                       |
| Alternative 2 | 595  | -0.8               | -56.3                       |
| Alternative 3 | 599  | -0.6               | -56.1                       |
| Alternative 5 | 583  | -1.8               | -57.3                       |
| Alternative 6 | 601  | -0.4               | -55.9                       |

## Effects on Old-growth Associated Wildlife Species

In order to estimate the effects of the alternatives on wildlife species, management indicator species are chosen for analysis. These species are used to predict how management activities may affect species with similar habitat requirements.

Thirteen species have been identified as Forest-wide management indicator species in the Forest Plan. All, except for the brown bear, have well-established populations within the project area. Six Forest-wide management indicator species (deer, mountain goats, marten, wolves, brown creeper, and Canada geese) plus moose as a project management indicator species were chosen to evaluate the environmental impacts of this project. Moose were evaluated in Issue 2; brown creepers were discussed in the above section on high-volume old growth. Marten, deer, goats, wolves, and Canada geese are analyzed in this section.

The U.S. Fish and Wildlife Service asked that the impacts of the timber harvest on brown bear be examined. Brown bear is not used as a management indicator species because it is extremely uncommon within the project area. Based on extensive field observations and anecdotal accounts, there is no evidence of a viable brown bear population within the project area for at least the past 40 years (Doerr 1997b).

The Forest Plan developed habitat capability models (Suring 1993, USDA Forest Service 1991a, Flynn 1995, DeGayner 1996) to estimate pre-logging, 1954 to present, and future habitat potential for each of the Forest-wide management indicator species. These models are used primarily as relative measures of the effects of Forest management activities on wildlife habitat. Model outputs are generally expressed in terms of habitat capability that can maintain a certain animal population number. These population numbers should not be confused with the actual numbers of a given species within the area. Actual population numbers of a species can vary widely from year to year as a result of many factors other than optimum habitat potential. The Forest Plan models were developed to measure the effects of clearcutting on wildlife habitat. We assumed that single-tree selection harvest would not produce measurable changes in model outputs. These models have not had extensive field-testing, and the numbers projected for each species serve as rough benchmarks to compare impacts among alternatives. Changes were made in the deer and wolf models between the DEIS and the FEIS as a result of comments to the DEIS. These changes are discussed in greater detail in the wolf and deer section.

### **Marten**

Marten represent species that need habitat in higher-volume old growth forests and are negatively affected by the presence of clearcuts, pole timber, and young sawtimber (Figure 3-8). Marten have been one of the key species protected through the establishment of well-distributed, old growth reserves in the Forest Plan. The model for marten (USDA Forest Service, 1991a) suggests that marten habitat has been reduced by about 14 percent since 1954.

The impacts of the proposed alternatives on marten are evaluated from the change in long-term carrying capacity predicted by the marten model and by the change in miles of Forest Service roads open to motorized access. The results of the model are shown in Table 3-20. This model estimates that long-term marten carrying capacity will decline by about one to two percent in the action alternatives compared to Alternative 1 (no action). This equates to a habitat reduction of two marten within the project area. By 2040, marten habitat capability is expected to be reduced to 85 percent of the 1954 value in Alternative 1 and to about 84 percent of the 1954 value in the action alternatives.

**Table 3- 20. Estimated Changes in Marten Carrying Capacity**

| Alternative | Year              | Percent Change from 1954 |                                | Estimated Marten Carrying Capacity (# of animals) |
|-------------|-------------------|--------------------------|--------------------------------|---|
|             |                   | Alternative Change       | Cumulative Change <sup>1</sup> |   |
| 1           | 2000              | 0%                       | -14%                           | 100%  |
|             | 2040              | -1%                      | -15%                           | 99%   |
| 2           | 2000 <sup>2</sup> | -2                       | -16                            | 98  |
|             | 2040              | -2                       | -16                            | 98  |
| 3           | 2000 <sup>2</sup> | -2                       | -16                            | 98  |
|             | 2040              | -2                       | -16                            | 98  |
| 5           | 2000 <sup>2</sup> | -2                       | -15                            | 99  |
|             | 2040              | -2                       | -16                            | 98  |
| 6           | 2000 <sup>2</sup> | -2                       | -16                            | 98  |
|             | 2040              | -2                       | -16                            | 98  |

<sup>1</sup> Cumulative change is the percent carrying capacity change from 1954, -14%, added to the percent change for each alternative.

<sup>2</sup> For the purposes of this analysis, it is assumed the timber harvest proposed in the alternatives will occur by 2000.

Roads may impact marten by increasing harvest due to improved access. The marten model assumes that marten densities will begin to decrease as road densities begin to exceed 0.2 mile of open roads/square mile, and at 0.6 mile of open road/square mile, marten densities will decline by 90 percent due to trapping pressure. Currently, within the project area, there are approximately 33 miles of open roads, including an estimated sixteen miles of temporary roads and two miles of roads on private lands, which equates to a road density of about 0.33 mile/sq. mile within the project area (Table 3-21). All alternatives including the No Action Alternative, will convert 9.4 miles of existing open temporary roads to permanent roads.



# Legend

## MARTEN HABITAT CAPABILITY VALUES:

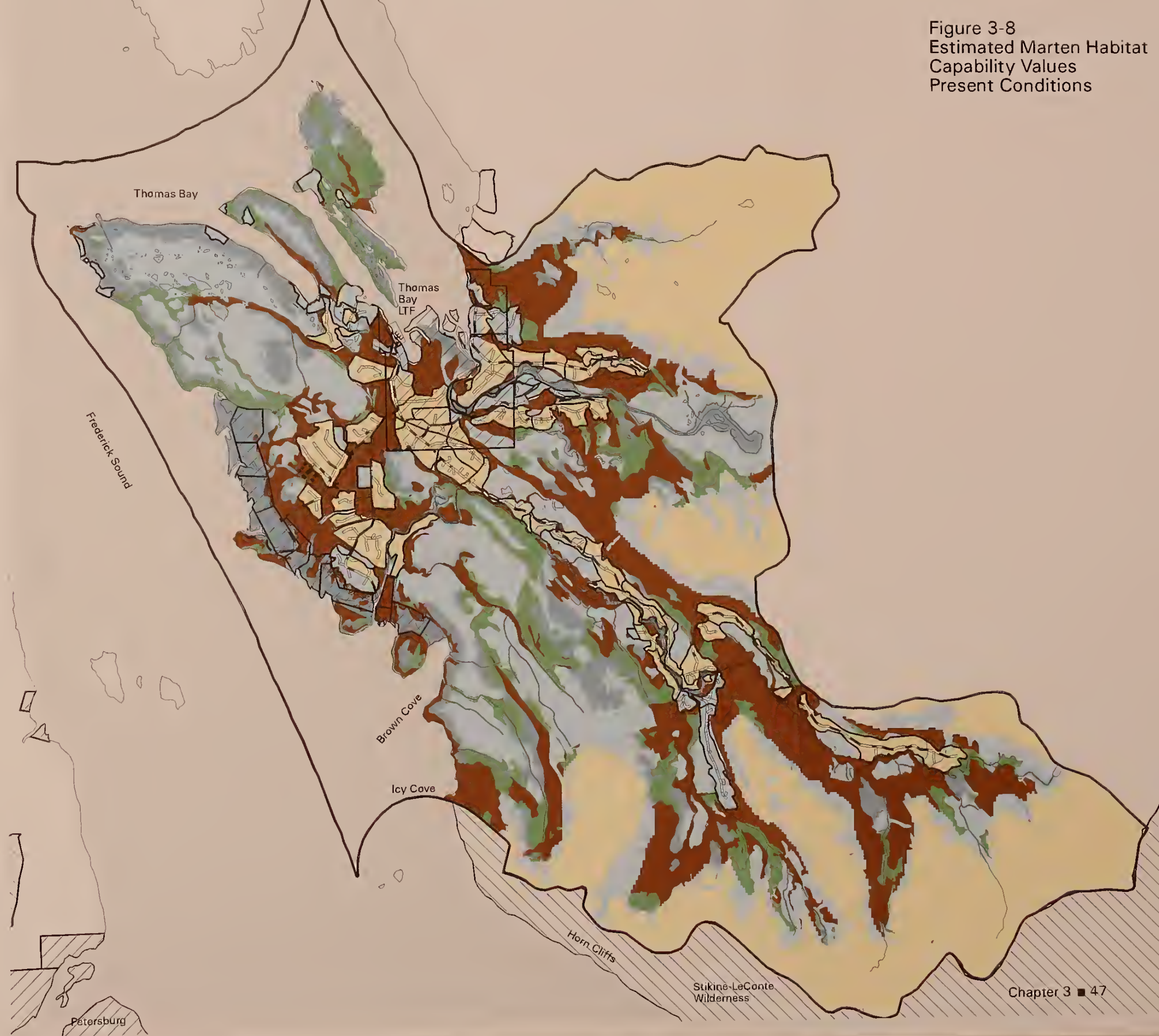
- 0.9 to 1.0 (Best Marten Habitat)
- 0.6 to 0.89
- 0.3 to 0.59
- 0.1 to 0.29
- 0.01 to 0.09 (Poor Marten Habitat)
- 0 (No Value)

## Saltwater

- Wilderness
- Non-National Forest Lands
- Log Transfer Facility (LTF)
- Existing Managed Stands
- Crystal Creek Project Area Boundary
- Existing Permanent Roads
- Existing Closed Roads
- Shoreline, Lakes, Class I/II Streams

Figure 3-8  
Estimated Marten Habitat  
Capability Values  
Present Conditions

0 7920 15840  
Scale is 1 inch = 7920 feet



map: /gis/projects/crystal/plots/feisplots/marten.map 10/20/98  
macros: feismap.apml, marten.apml



All alternatives propose to close almost all new road construction and 6.6 miles of existing open temporary road. The maintained road density after timber harvest would range from 0.27 mile/square mile in Alternative 1 to 0.30 mile/square mile in Alternative 3. The open road density post-sale is not expected to affect the viability of marten within the project area.

Some increase in motorized access for trapping will be provided by new road construction that will remain open during timber harvest operations and roads that will be physically open to some all terrain vehicles after road closure. This increase in road access is not expected to have significant long-term negative effects on marten populations within the project area because of the large blocks of unroaded habitat that surround the roaded area. State harvest records for marten will be reviewed annually to determine if the harvest patterns are changing.

**Table 3- 21. Estimated Changes in Open Road Densities<sup>1</sup>**

| Alt. | Miles of Open Permanent Roads | Miles of Open Temporary Roads Converted to Permanent Road | Total Open Road Density <sup>2</sup> (mile/sq. mile) |
|------|-------------------------------|---|--|
| 1    | 17.2                          | 9.4   | 0.27   |
| 2    | 19.7                          | 9.4   | 0.29   |
| 3    | 20.3                          | 9.4   | 0.30   |
| 5    | 19.7                          | 9.4   | 0.29   |
| 6    | 19.7                          | 9.4   | 0.29   |

<sup>1</sup>Results shown are the anticipated long-term changes after project implementation and display roads that are maintained for public access.

<sup>2</sup>Road densities include an estimated two miles of open roads on private lands.

### Sitka Black-Tailed Deer

Sitka black-tailed deer is a management indicator species that prefers higher volume old-growth forest for winter habitat and is an important sport hunting and subsistence species. Young clearcuts provide poor winter habitat because they lack overstory canopies that can intercept snowfall (Wallmo and Schoen 1980). Pole stands are typically poor winter habitat because they generally have closed canopies that shade out understory forage species. Important deer wintering areas within the project area include Ruth Island, the beach fringe forest on the Bock Bight and Point Agassiz Peninsulas, the river terrace forests along the lower one mile of the Patterson River (on State land), the higher volume forests in the lower two miles of the Muddy River drainage inland, and the forested hillsides adjacent to Frederick Sound from the mouth of the Muddy River to Horn Mountain (Figure 3-9).



The Forest Plan deer model (USDA Forest Service 1991a, DeGayner 1996) was modified for this project to account for thinning, single-tree selection harvest, and group selection harvest. Thinning should maintain the forage in clearcuts for about 20 years after treatment. Openings created by group selection harvest would affect deer habitat similar to clearcutting. If 30 percent of a unit was harvested by group selection, the harvested 30 percent would have deer habitat values similar to a clearcut and the other 70 percent of the unit would have old growth values. Based on observations gathered on one site, the habitat capability for deer could be improved with single-tree selection harvest which removed up to 40 percent of the basal area. The Forest Plan deer panel model assumed that deer populations would be maintained about 36 percent below carrying capacity where wolves were present. This reduced value represents the deer habitat potential available for hunters used in the subsistence analysis.

The Forest Plan used a theoretical winter deer density of 125 deer/square mile in habitats with a suitability index of 1.0. The Alaska Department of Fish and Game [Shea (1997)] suggested that the theoretical winter deer density should be 100 deer/square mile in habitats with a suitability index of 1.0 (Person et al. 1997). Based on this comment, we reduced the predicted deer numbers by 20 percent to incorporate this suggestion. A habitat suitability of 1.0 is near the maximum theoretical winter density for deer. We did not adopt the suggestion of Shea (1997) that second growth stands older than 25 years that have been thinned or pruned are less valuable winter deer habitat than younger, more open clearcuts. We could not find quantitative data to support this. Since the deer model habitat capability value for older clearcuts is low to begin with, lowering them slightly more would not produce major changes in the model results.

The project area deer model suggests that deer habitat capability has been reduced by about 19 percent since 1954. Pellet-group counts in the spring of 1996 in VCU 489 suggest that the deer population is moderately high (Kirchhoff 1996).

Impacts of the proposed alternatives on deer are evaluated from the changes in long-term carrying capacity predicted by the project-area deer model (Table 3-22). This model estimates that deer carrying capacity will decline by less than 2 percent in Alternatives 2, 3, and 6 compared to Alternative 1 (no action). The predicted decline in deer habitat potential as a result of Alternative 5 is slightly more than one percent due, in part, to the higher use of single-tree selection harvest. The proposed timber harvests in Alternatives 2, 3, 5, and 6 are expected to result in a long-term decline of carrying capacity equivalent to 21, 22, 13, and 20 deer, respectively. The effect of thinning or otherwise treating about 2,300 acres of existing second growth, including 1,600 acres proposed for this project, is projected to maintain enough habitat to support an estimated 18 additional deer for about 20 years. If no further timber harvest or thinning occurs other than this project, deer habitat capability is expected to be reduced to about 79 percent of the 1954 (prelogging) value in Alternative 1, to about 77 percent of the 1954 value in Alternatives 2, 3, and 6, and to about 78 percent of the 1954 value in Alternative 5.

The effects of declines in deer habitat potential on subsistence hunting and on wolf populations are discussed in the Subsistence and the Alexander Archipelago wolf sections.

Legend

- DEER WINTER HABITAT  
CAPABILITY VALUES:
- 0.9 to 1.25 (Best Deer Winter Habitat)
  - 0.6 to 0.89
  - 0.3 to 0.59
  - 0.1 to 0.29
  - 0.01 to 0.09 (Poor Deer Winter Habitat)
  - 0 (No Value)

- Saltwater
- Wilderness
- Non-National Forest Lands
- Log Transfer Facility (LTF)
- Existing Managed Stands
- Crystal Creek Project Area Boundary
- Existing Permanent Roads
- Existing Closed Roads
- Shoreline, Lakes, Class I/II Streams

Figure 3-9  
Estimated Deer Winter Habitat  
Capability Values  
Present Conditions

0 7920 15840  
Scale is 1 inch = 7920 feet

map: g:\projects\crystal\plots\feisplots\deer.map 10/20/98  
workspace: feismap.aprx, deer.aprx

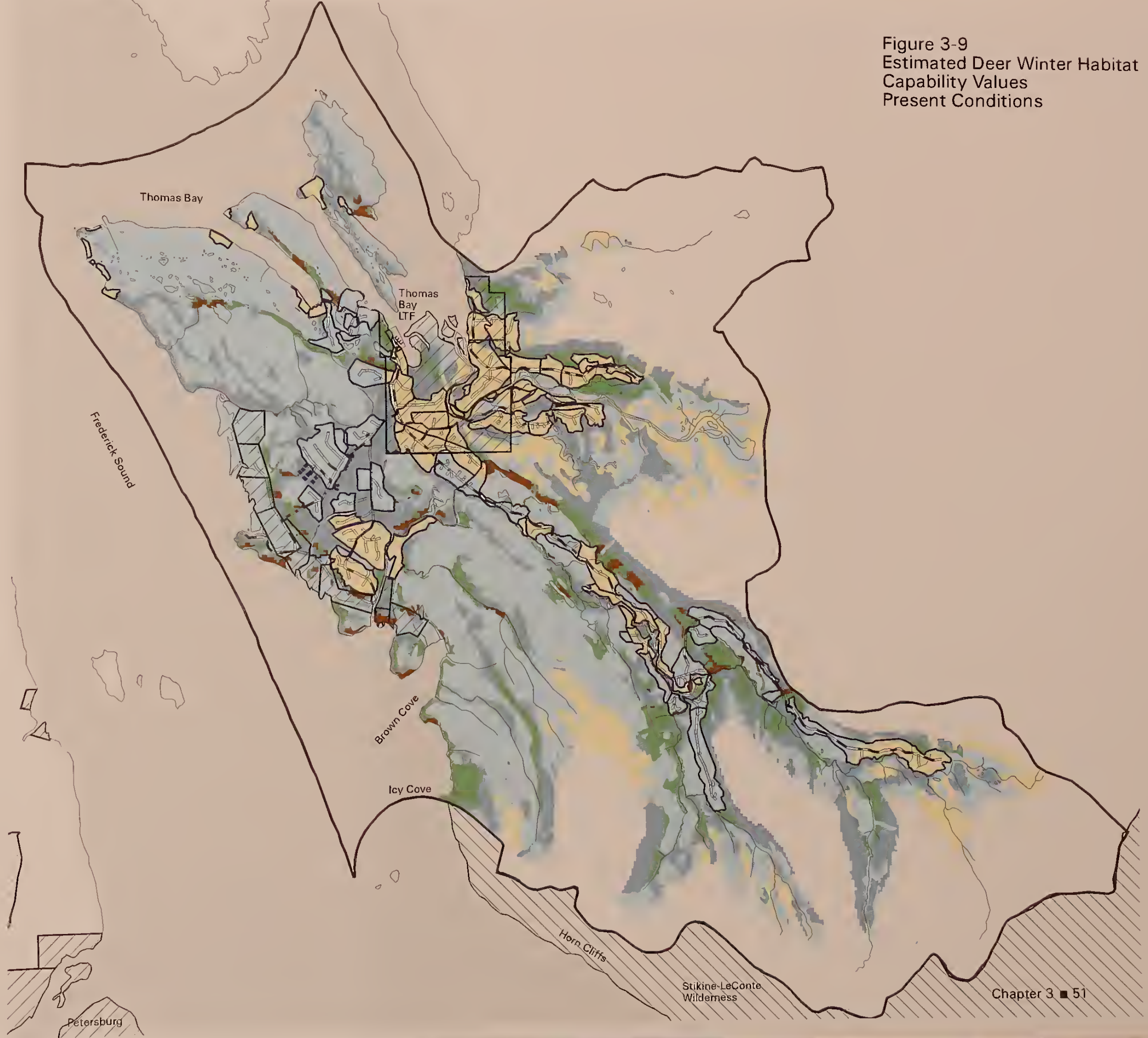






Table 3- 22. Estimated Changes in Deer Carrying Capacity

|   | Year              | Estimated Deer Carrying Capacity (# of animals <sup>1</sup> ) | Percent Change     |                             |
|---|-------------------|---|--------------------|-----------------------------|
|   |                   |   | Alternative Change | Cumulative Change from 1954 |
| Alternative 1<br><i>without thinning</i> <sup>2</sup> | 2000              | 1,078   | 0                  | -18.9                       |
|   | 2010              | 1,076   | +1.4               | -19.0                       |
|   | 2010              | 1,058   | 0                  | -20.3                       |
|   | 2040              | 1,047   | 0                  | -21.1                       |
| Alternative 2<br><i>without thinning</i> <sup>2</sup> | 2000 <sup>3</sup> | 1,062   | -1.1               | -20.0                       |
|   | 2010              | 1,060   | +0.1               | -20.2                       |
|   | 2010              | 1,042   | -1.2               | -21.5                       |
|   | 2040              | 1,026   | -1.7               | -22.8                       |
| Alternative 3<br><i>without thinning</i> <sup>2</sup> | 2000 <sup>3</sup> | 1,060   | -1.3               | -20.2                       |
|   | 2010              | 1,058   | 0                  | -20.3                       |
|   | 2010              | 1,040   | -1.4               | -21.7                       |
|   | 2040              | 1,025   | -1.7               | -22.8                       |
| Alternative 5<br><i>without thinning</i> <sup>2</sup> | 2000 <sup>3</sup> | 1,066   | -0.8               | -19.7                       |
|   | 2010              | 1,064   | +0.5               | -19.9                       |
|   | 2010              | 1,046   | -0.9               | -21.2                       |
|   | 2040              | 1,034   | -1.1               | -22.2                       |
| Alternative 6<br><i>without thinning</i> <sup>2</sup> | 2000 <sup>3</sup> | 1,063   | -1.0               | -19.9                       |
|   | 2010              | 1,043   | +0.2               | -21.4                       |
|   | 2010              | 1,061   | -1.1               | -20.2                       |
|   | 2040              | 1,027   | -1.6               | -22.7                       |

<sup>1</sup>Deer numbers shown are the estimated deer habitat potential reduced by 36% due to wolf predation, including past logging on State lands, and assuming a theoretical winter carrying capacity of 100 deer/sq. mile in habitats with a suitability index of 1.0.

<sup>2</sup> Assumes that no further thinning or pruning of second growth will occur.

<sup>3</sup> For the purposes of display and analysis it is assumed the timber harvest proposed in the alternatives will occur by Year 2000.

### Mountain Goat

Mountain goats are an indicator species for animals that prefer old-growth forests near cliffs and subalpine habitat and are an important species for sport hunting and subsistence. The model (Suring 1993) for mountain goats assumes that the preferred winter habitats are old-growth forests on southerly aspects within 400 meters of cliffs and subalpine habitats and rock outcrops on southerly aspects. Mountain goats have also been observed using windswept alpine ridge tops within the project area during the winter, similar to winter habitat use patterns reported in more northern areas of Southeast Alaska. Clearcuts and pole stands are both assumed to be poor winter habitat.

The forest-wide model assumes that road and trail access within two miles of goat habitat will reduce habitat carrying capacity because of increased human disturbance and increased hunting pressure. Within the project area, this has not been the case. The road to the upper Muddy River drainage accesses a very high-use goat wintering area, but there is no evidence that human disturbance or hunting have reduced the habitat potential. This is partly because mountain goats concentrate in this area during periods of deep snowfall,

which usually occurs after the hunting season. Despite considerable road access within or adjacent to goat habitat, there has been relatively little hunting pressure on goat populations within the project area.

Important goat habitat areas include the Delta Creek watershed, slopes north of the Patterson River, the lower end of the Patterson Glacier, alpine/subalpine habitats of Horn and Thunder Mountains, the steep hillside east of Crystal Creek, the mountain range southeast of Ess Lake, and the south facing slopes along the Muddy River. Recent fieldwork indicates that goats winter extensively in the forests throughout the Crystal Creek drainage, along the south side of the upper Muddy River drainage, and on the steep north-facing portion of the Ess Creek drainage (Figure 3-10). A relatively large goat population that receives substantial hunting pressure occurs in the Stikine-LeConte Wilderness Area of Horn Cliff's to the south of the project area. Concern was expressed by the public and by management agencies that improved road access in the Crystal Creek drainage would increase harvest of the Horn Cliff's goat population. The effects of the alternatives on mountain goats are evaluated by the amount of harvest in goat habitat and the increase in human access to the Horn Cliff's area.

The amount of new openings proposed in goat winter range is ranked as follows: Alternative 1 (0 acres), Alternative 5 (144 acres), Alternative 6 (224 acres), Alternative 2 (265 acres), and Alternative 3 (409 acres). Much of this habitat is considered marginal winter range by the current model for goats. Assuming a winter carrying capacity of 2.3 goats/square mile for this habitat (i.e. 20 percent of the carrying capacity value of the very best goat habitat), the long-term loss in carrying capacity follows: Alternative 1 (0 goats), Alternative 5 (0.5 goat), Alternative 6 (0.8 goat), Alternative 2 (1.0 goat), and Alternative 3 (1.5 goats).

Alternatives 1 and 5 would not construct any new roads in the Crystal Creek drainage. A motorized vehicle closure is proposed for the bridge crossing of the Muddy River into the Crystal Creek drainage in Alternatives 2, 3, and 6. Newly constructed roads in the Crystal Creek drainage will be closed after timber harvest, further restricting access. This road closure is proposed, in part, to minimize the potential for over harvest of the Horn Cliff's goat population. The shortest distances between the alpine habitat of Horn Mountain above 2000 feet elevation and the end of the closed roads are about 1.75 miles in Alternatives 1 and 5; 0.8 mile in Alternative 6; and 0.6 mile in Alternatives 2 and 3.

Vertical and horizontal buffers of 1500 feet will be maintained between logging activities and any known kidding areas or other important traditional summer goat habitat areas. Helicopter activities associated with logging will be seasonally restricted to avoid these areas where feasible (Forest Plan, page 4-117).



# Legend

- Best Winter Habitat Areas  
(south aspect, slope > 50%)
- Moderate Winter Habitat Areas  
(north, east, west aspect, slope > 50%)
- Mediocre Winter Habitat Areas  
(all 40%-50% slopes)
- Lakes
- Existing Managed Stands
- Wilderness
- Non-National Forest Lands
- 1300-ft Distance From Cliffs \*
- Existing Permanent Roads
- Existing Closed Roads
- Streams and Shoreline
- Study Area Boundary

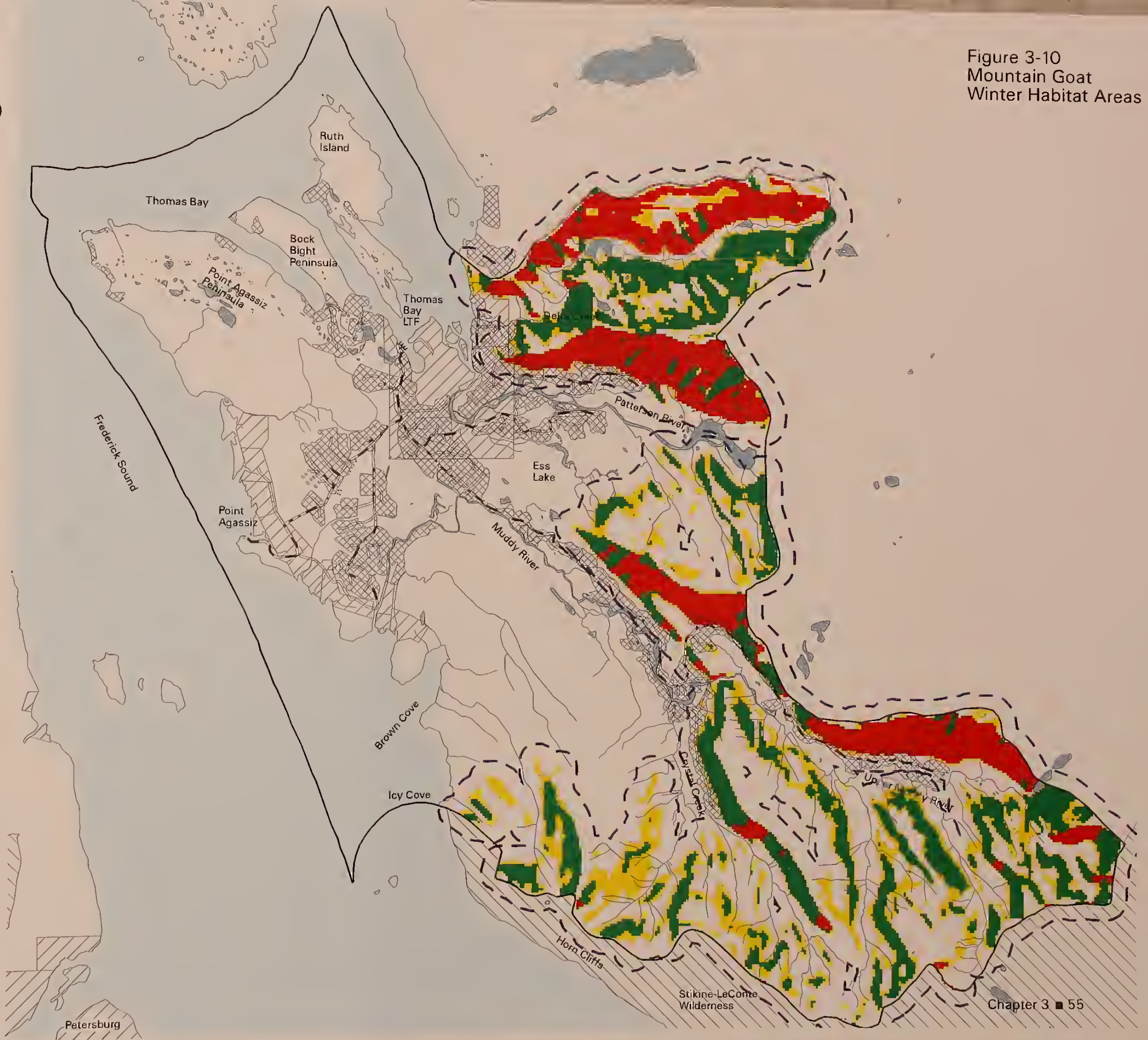
\*Studies indicate that mountain goats are closely associated with areas dominated by cliffs and steep slopes. (USDA-FS, 1991a)

Figure 3-10  
Mountain Goat  
Winter Habitat Areas

0 7920 15840  
Scale is 1 inch = 7920 feet



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Source: (crystal.aml, goat.aml)







Some increase in goat hunting is anticipated in the Upper Muddy River drainage and the mountain range above Ess Lake in all action alternatives. Both these areas have relatively large goat populations that presently receive little hunting pressure and are adjacent to vast areas of pristine goat country. No over harvest of these goat populations is anticipated in any of the alternatives. We will annually evaluate goat harvests which are monitored yearly by the Alaska Department of Fish and Game. If over harvest of goats is indicated by the harvest data the Forest Service will consider further road closures and may make recommendations to change hunting regulations.

#### **Alexander Archipelago Wolf**

The project area supports a relatively high density of wolves. The abundance of wolves is attributed to the presence of deer and moose, plus a high density of beaver. No wolf denning sites are known within the project area.

The analysis of the effects of the alternatives on wolf in the FEIS was revised from the DEIS in response to the Alaska Department of Fish and Game comment [Shea (1997)]. The Forest Plan evaluation of wolves assumed that an equilibrium can be maintained between wolves and deer if the deer population is kept about 30 percent below carrying capacity (Person et al. 1997). At this level, the deer population will have a high reproductive rate that will provide excess deer for both wolves and hunters. As the deer population approaches carrying capacity, the quality of the deer habitat declines, as does the reproductive rate of the herd. Although there are more deer, reproduction levels decline so there are fewer surplus deer for wolves and hunters. Consequently, the deer population is more likely to decline due to excessive mortality from wolves and hunters.

For the purposes of deer habitat management and analysis of the effects of the alternatives, a prey base of a minimum of 13 deer/square mile has been identified as a threshold of concern (Person et al. 1997). If the deer population falls below that value, the probability of wolf predation causing a decline of deer increases. The deer density was calculated for this FEIS assuming that deer would be about 36 percent below carrying capacity (DeGayner 1996) and that a deer habitat suitability value of 1.0 equaled 100 deer/sq. mile in the absence of wolves.

For this analysis, it was also necessary to account for the presence of moose and goats and convert them to "deer-equivalents" for the purposes of evaluating changes in available prey. We followed suggestions provided by Person (Doerr 1998) and ignored the presence of mountain goats because they would probably not be a significant prey item for wolves and used a 2.1 "deer-equivalent" per moose as derived by Fuller (1989).

Table 3-23 shows changes in prey biomass, expressed as "deer-equivalents" for each alternative. This analysis suggests that available prey has been reduced by about 12 percent since 1954 due to past logging and will decline another 9 percent if understory is lost in the existing second growth. The action alternatives will maintain prey abundance similar to the no-action alternative through Year 2010. Alternatives 2, 5, and 6 will have the highest prey habitat capability.

Thinning of second growth has the potential to maintain about 2.5 percent more prey than alternatives without thinning. If no further silvicultural treatment of second growth or logging occurs after Year 2010, prey availability by Year 2040 will decline by 1.0 percent in Alternative 5; 1.4 percent in Alternative 6; 1.5 percent in Alternative 3; and 1.7 percent in Alternative 2 compared to Alternative 1. Potential prey abundance, estimated from habitat capability with reductions for wolf predation, will remain above 13 "deer-equivalents" in all alternatives beyond Year 2040. None of the alternatives are expected to

affect the viability of wolves due to prey availability in the long-term and all action alternatives should provide prey habitat similar to the no-action alternative for the next 20-30 years. Changes in moose, deer, and goat habitat potential are not expected to reduce wolf populations within the project area for any action alternative.

**Table 3- 23. Estimated Changes in Wolf Prey Biomass**

| Alternative                      | Year | Deer <sup>1</sup> | Moose <sup>2</sup> | Deer-Equivalents/<br>Square Mile <sup>3</sup> | % Change In Prey Biomass |                                |
|----------------------------------|------|-------------------|--------------------|---|--------------------------|--------------------------------|
|                                  |      |                   |                    |   | Alternative Change       | Cumulative Change<br>From 1954 |
| Prelogging                       | 1954 | 1,328             | 212 <sup>4</sup>   | 17.7  | n/a                      | n/a                            |
| Present                          | 1997 | 1,078             | 229                | 15.6  | n/a                      | -12.1                          |
| Alt. 1                           | 2010 | 1,076             | 197                | 14.9  | 2.5                      | -16.2                          |
| Alt. 1 without thin              | 2010 | 1,058             | 182                | 14.4  | 0.0                      | -18.7                          |
| Alt. 1                           | 2040 | 1,058             | 167                | 14.0  | 0.0                      | -21.1                          |
| Alt. 2                           | 2010 | 1,060             | 206                | 14.9  | 2.5                      | -16.2                          |
| Alt. 2 without thin <sup>5</sup> | 2010 | 1,042             | 191                | 14.4  | 0.1                      | -18.6                          |
| Alt. 2                           | 2040 | 1,026             | 163                | 13.7  | -1.7                     | -22.8                          |
| Alt. 3                           | 2010 | 1,058             | 203                | 14.8  | 2.1                      | -16.6                          |
| Alt. 3 without thin <sup>5</sup> | 2010 | 1,040             | 189                | 14.4  | -0.3                     | -19.0                          |
| Alt. 3                           | 2040 | 1,025             | 165                | 13.7  | -1.5                     | -22.6                          |
| Alt. 5                           | 2010 | 1,064             | 203                | 14.9  | 2.5                      | -16.2                          |
| Alt. 5 without thin <sup>5</sup> | 2010 | 1,046             | 189                | 14.4  | 0.1                      | -18.6                          |
| Alt. 5                           | 2040 | 1,034             | 165                | 13.8  | -1.0                     | -22.1                          |
| Alt. 6                           | 2010 | 1,061             | 206                | 14.9  | 2.6                      | -16.2                          |
| Alt. 6 without thin <sup>5</sup> | 2010 | 1,043             | 191                | 14.4  | 0.1                      | -18.6                          |
| Alt. 6                           | 2040 | 1,027             | 165                | 13.7  | -1.4                     | -22.5                          |

<sup>1</sup> Deer numbers are estimated from habitat suitability values, reducing the deer population 36% below carrying capacity and assuming a carrying capacity of 100 deer/square mile in habitats with a suitability index of 1.0. These numbers are significantly conservative.

<sup>2</sup> Moose numbers are estimated from habitat suitability values assuming a 1980 population of 250 moose and assuming that future populations fluctuate proportional to projected habitat capability.

<sup>3</sup> Each moose was assumed to represent 2.1 deer equivalents (Fuller 1989).

<sup>4</sup> Moose were still colonizing the mainland of central Southeast Alaska in the 1950's and the 1954 moose population may have been well below estimated carrying capacity.

<sup>5</sup> It assumes no thinning of existing second-growth stands will occur after 1997 so the effects of proposed thinning on prey biomass can be displayed.

Roads may impact wolves by increasing human harvest due to improved access. The Forest Plan wolf panel made no recommendations regarding a maximum road density (Person et al. 1996). However, the U. S. Fish and Wildlife Service has recommended that open road densities be kept below 0.7 mile/ square mile during and after project implementation (Allen 1997). Currently, within the project area, there are approximately 33 miles of open roads and about 36 miles of shoreline. This equates to 69 miles of access within about a 100 square mile area (VCUs 487 and 489). The current density of 0.69 mile of access/sq. mile has resulted in a recent yearly average wolf harvest of about one wolf per 53 miles of open access roads and shoreline.

All action alternatives propose to close almost all new road construction and 6.6 miles of existing open temporary road. There will be a motorized vehicle closure limiting public access during timber harvest at the Muddy River crossing near the mouth of Crystal Creek. Road miles and densities are estimated for each alternative, assuming all new roads are open, and then assuming that almost all new roads are closed (Table 3-24).



None of the alternatives would exceed the road density concern of the U. S. Fish and Wildlife Service for wolves (Allen 1997), even without the proposed road closure at the Muddy River crossing. The maximum short-term density would be 0.56 mile of road/square mile without road closures. After timber harvest, in all alternatives the density of open roads would be slightly lower than the existing condition.

If wolf harvests are directly related to miles of access, the average yearly wolf harvests within the project area would be 1.7 wolves/year or less during timber harvest under all alternatives, assuming no road closures. This level of harvest would not be excessive, given the size of the area and the estimated number of wolves the area is capable of supporting. The harvest of wolves will be monitored within the project area through the State sealing requirements. If excessive wolf harvests occur, additional road access restrictions and/or hunting and trapping restrictions may be necessary. The viability of wolves is further protected by the presence of the Stikine-LeConte Wilderness and roadless areas bordering the project area on three sides which provide sources for wolf immigration into the area if the wolf population becomes low.

**Table 3- 24. Estimated Miles and Densities of Road/Shoreline Access and Resulting Wolf Harvests, VCUs 487 and 489**

|                               | Maximum Possible Miles of Access During Sales <sup>1</sup> | Post Sale <sup>2</sup> |
|-------------------------------|--|------------------------|
| <b>Alternative 1</b>          |  |                        |
| Shoreline & Open Road Miles   | 69 <sup>3</sup>  | 63                     |
| Miles of Access/square Mile   | 0.69   | 0.63                   |
| Road Miles/square Mile        | 0.33   | 0.27                   |
| Estimated Yearly Wolf Harvest | 1.3 <sup>4</sup>   | 1.2                    |
| <b>Alternative 2</b>          |  |                        |
| Shoreline & Open Road Miles   | 92   | 65                     |
| Miles of Access/square Mile   | 0.92   | 0.65                   |
| Road Miles/square Mile        | 0.56   | 0.29                   |
| Estimated Yearly Wolf Harvest | 1.7  | 1.2                    |
| <b>Alternative 3</b>          |  |                        |
| Shoreline & Open Road Miles   | 86   | 66                     |
| Miles of Access/square Mile   | 0.86   | 0.66                   |
| Road Miles/square Mile        | 0.50   | 0.30                   |
| Estimated Yearly Wolf Harvest | 1.7  | 1.2                    |
| <b>Alternative 5</b>          |  |                        |
| Shoreline & Open Road Miles   | 83   | 65                     |
| Miles of Access/square Mile   | 0.83   | 0.65                   |
| Road Miles/square Mile        | 0.47   | 0.29                   |
| Estimated Yearly Wolf Harvest | 1.6  | 1.2                    |
| <b>Alternative 6</b>          |  |                        |
| Shoreline & Open Road Miles   | 91   | 65                     |
| Miles of Access/square Mile   | 0.91   | 0.65                   |
| Road Miles/square Mile        | 0.55   | 0.29                   |
| Estimated Yearly Wolf Harvest | 1.7  | 1.2                    |

<sup>1</sup>Assumes all roads are constructed and open before any roads are closed.

<sup>2</sup> Assumes 6.6 miles of open temporary roads will be closed in all alternatives. Assumes that about 3.2 miles of road construction or reconstruction would remain open after the sale in Alternatives 2, 5, and 6, and 3.8 miles of road construction or reconstruction would remain open in Alternative 3. Assumes closure of 0.7 miles of existing Road 6256 in all action alternatives.

<sup>3</sup> Includes 36 miles of shoreline, 17 miles of open forest development roads, and an estimated 16 miles of open temporary roads.

<sup>4</sup>From 1987-95, an average of 1.3 wolves have been harvested within VCUs 487 and 489, given 69 miles of shoreline and open roads. Future harvests are assumed to be proportional to the miles of open roads and shorelines.

### Vancouver Canada Geese

Vancouver Canada geese represent species that utilize wetland forests and forests in proximity to surface water for nesting and brood rearing (Suring 1993). Adequate nesting and brood rearing habitat is assumed to be the limiting habitat factor in the model for geese. Clearcuts are assumed to have zero habitat value because of a lack of overstory nesting cover, although nesting geese and geese with broods have been observed in clearcuts within the project area. Pole stands are assumed to have zero value because of very low understory production.

Nesting by Canada geese is common within the project area, due partly to the high abundance of forested wetlands and old growth adjoining ponds, lakes, and sloughs. Although few goose nests have actually been found, adult pairs are seen throughout the lowland area during the spring nesting season. A pair of adult geese with young was observed in a wetland slough within a clearcut west of the lower portion of the Muddy River. Concentrated goose nesting has been found in the grass flats surrounding Point Agassiz and a few nests in trees have been found in the old growth and clearcuts between Point Agassiz and Thomas Bay. Dozens of geese have been observed molting on a lake on Ruth Island and foraging on skunk cabbage in a nearby clearcut. The estuarine meadows and mudflats at the mouths of the Patterson and Muddy Rivers and adjacent to Point Agassiz are important wintering areas for geese and other waterfowl within the project area.

Wetlands that are known or likely to be used by geese and other waterfowl for nesting, brooding, and rearing young have been identified within the project area. Buffers of 330-foot width have been placed around these wetlands. Within this buffer, proposed harvest is generally limited to group selection harvest or single-tree selection of 40 percent or less. Timing clauses have been placed on these buffers to restrict tree falling and yarding during the period April 1 to July 31. Because geese within the project area show a high incidence of nesting in trees, some large-diameter live trees may be topped within certain units in some of the alternatives to provide for future nest sites. Snags and dying trees will be emphasized in the retention of reserve trees in units that may receive goose nesting (Appendix A).

Because Canada geese nest extensively throughout the project area, some disruption of nesting and brood-rearing is likely in all alternatives that harvest timber and treat second growth, despite the above protective measures. The likelihood of each alternative to disrupt goose nesting is ranked by alternatives based on the number of timber harvest units near or within wetland areas where nesting is believed to be most likely. The alternatives are ranked as follows: Alternative 1 (0 units - least likely to disrupt goose nesting/brood rearing), Alternative 3 (2 units), Alternative 2 (9 units), Alternative 6 (10 units), and Alternative 5 (20 units - most likely to disrupt goose nesting/brood rearing).



## Issue 4 - Recreation

The Thomas Bay area is very popular for recreation with a wide diversity of activities available. The close proximity to Petersburg makes it easy for day or weekend trips. People use the Patterson River area for hunting, rafting, and hiking. One outfitter/guide is currently permitted for raft trips down the Patterson River. Although there is not a developed trail along the Patterson River, it is a relatively easy hike along the south side, starting on an old logging road and then paralleling the river through the woods to an open area directly across from the Patterson Glacier. It is also possible to follow the logging roads on the north side and then hike through the woods a short distance to the upper portion of the Patterson River.

Many moose hunters from Petersburg establish camps along the Patterson and Muddy Rivers during the hunting season. Five Special Use Permits were issued in 1996 and 1997 for moose hunting tent platforms within the project area.

Mountain biking along the existing logging roads is a popular day trip from Petersburg via boat. Approximately 17 miles of specified road in the project area can be accessed by boat.

Attractions within the Thomas Bay area but outside the Crystal Creek Project Area include three Forest Service cabins (Spurt Cove, Cascade Creek, and Swan Lake), the Cascade Creek Trail, and Falls Lake Shelter. Undeveloped attractions include Baird Glacier for sightseeing and hiking, and salmon and halibut fishing. There is also a spectacular waterfall a one quarter mile up from saltwater on Cascade Creek. Some small cruise ships come into Thomas Bay to drop off sightseers at Cascade Creek to view this waterfall.

### Historic Recreation Trails

Two historic trails exist within the analysis area that are no longer maintained in the Forest Service trail system. One trail connected Brown Cove to Brown Cove Lake and then followed the Muddy River to the base of the Muddy Glacier. The trail was constructed in the late 1940's and marked with tree blazes for about 12 miles. Many of the tree blazes, some cut logs, and trail tread can be seen today along with the remnants of a shelter that was built when the trail was constructed.

The other historic trail in the analysis area starts at the mouth of Delta Creek just north of where the Patterson River empties into saltwater. The four-mile trail follows Delta Creek up to Ruth Lake.

### Recreation Opportunity Spectrum

To describe, identify, and quantify recreation settings, the Forest Service uses the Recreation Opportunity Spectrum (ROS). The ROS categorizes areas by their activities, remoteness, access, and experiences in a spectrum of classes from Primitive to Urban (Glossary). The Crystal Creek Project Area includes four of the seven classes in the Recreation Opportunity Spectrum: Primitive, Roaded Modified, Semi-primitive Motorized, and Semi-primitive Non-Motorized (Figure 3-11 and Table 3-25). The Primitive area includes an area east of Ruth Lake and another area northeast of Horn Cliffs. The Roaded Modified area includes the previously harvested stands and road corridors. The Semi-primitive Motorized area includes most of the shoreline where it is not Roaded Modified. The Semi-primitive Non-Motorized class occupies the rest of the analysis area.

# Legend














-  Crystal Creek Project Area Boundary
-  Existing Permanent Roads
-  Existing Closed Roads
-  Shoreline, Lakes, Class I/II Streams
-  Existing Managed Stands
-  Saltwater
-  Wilderness
-  Non-National Forest Lands
-  Primitive
-  Semi-Primitive Motorized
-  Semi-Primitive Nonmotorized
-  Roaded Modified
-  Log Transfer Facility (LTF)

Figure 3-11  
Recreation Opportunity Spectrum  
(ROS) Classes

0 7920 15840  
Scale is 1 inch = 7920 feet

map: /gis/projects/crystal/plots/feisplots/ros.map 10/20/98  
macros: feismap.aml, ros.aml







**Table 3- 25. Recreation Opportunity Spectrum Class in the Crystal Creek Project Area**

| ROS Class                           | Acres  | Percent |
|-------------------------------------|--------|---------|
| Primitive (P)                       | 6,810  | 11      |
| Semi-Primitive Non-Motorized (SPNM) | 35,940 | 57      |
| Semi-Primitive Motorized (SPM)      | 2,170  | 4       |
| Roaded Modified (RM)                | 17,820 | 28      |

In all alternatives, the number of acres of Primitive and Semi-primitive Motorized ROS classes remain the same (Table 3-26). In the action alternatives, the number of acres in the Semi-primitive Non-motorized ROS class decreases and the Roaded Modified ROS class acres increase. The most change would occur in Alternatives 2 and 3. Somewhat less changes would occur in Alternative 6 than Alternatives 2 and 3. Alternative 5 has the least change to ROS Classes since much of the proposed timber harvest in this alternative occurs in previously harvested areas that are already in the Roaded Modified ROS Class. Although Alternative 5 has the least change to ROS class, the actual impacts will be greater since much of the proposed harvest takes place near the Point Agassiz road system where recreation is presently popular.

**Table 3- 26. Change in Recreation Opportunity Classes by Alternative**

| ROS Class  | Alt. 1<br>acres | Alt. 2<br>acres | Alt. 3<br>acres | Alt. 5<br>acres | Alt. 6<br>acres |
|--|-----------------|-----------------|-----------------|-----------------|-----------------|
| Primitive  | 6,810           | 6,810           | 6,810           | 6,810           | 6,810           |
| Semi-Primitive Non-Motorized                                       | 35,940          | 30,810          | 31,250          | 34,400          | 32,290          |
| Semi-Primitive Motorized   | 2,170           | 2,170           | 2,170           | 2,170           | 2,170           |
| Roaded Modified  | 17,820          | 22,950          | 22,510          | 19,370          | 21,470          |
| Acres Changed from Semi-Primitive Non-Motorized to Roaded Modified | 0               | 5,130           | 4,690           | 1,550           | 3,650           |

## Recreation Places

Recreation Places are areas of land and water with characteristics that provide opportunities for recreation activities. There are four Recreation Places within the project area. The largest place is the roaded area along the Muddy and Patterson Rivers. Recreation activities are associated with road access and include hunting, mountain biking, and sightseeing. Another Recreation Place extends up the Patterson River beyond the roaded area. Activities include moose hunting, river rafting, hiking, and sightseeing. A third Recreation Place includes the beach and shoreline of Brown Cove and Icy Cove. Activities include beachcombing, picnicking, camping, and boating. A fourth Recreation Place includes the beach and shoreline near Wood Point on the northwest corner of the Point Agassiz Peninsula. The beach is used for beachcombing, picnicking, and tent camping, especially by kayakers.

The Patterson River, Wood Point, and Brown Cove/Icy Cove Recreation Places will not be greatly affected by any of the alternatives. No roads or units have been proposed within these areas. However, it is possible that during actual harvest, distant sounds could be heard from the logging operations.

The roaded Recreation Place around Point Agassiz, Muddy River, and the Patterson River may receive some impacts in the action alternatives. Recreationists may expect to see more people because of road construction and reconstruction of the log transfer facility. During timber harvest, the sights and sounds of logging and increased road use could temporarily disrupt some activities.

## Proposed Ess Lake Recreation Shelter and Access Trail

An area on the northeast end of Ess Lake is proposed for a three-sided shelter/picnic area in Alternatives 2, 5, and 6 (Figures 2-2, 2-4, and 2-5). About a quarter-mile trail would be constructed from the existing road system to access the shelter. The trail will need gravel or boardwalk surfacing to minimize muskeg damage (Appendix A). If fill is used to construct the access trail a 404 Wetlands Permit will be obtained.

## Potential Patterson River Trails

Patterson Glacier can be seen by hiking along the south side of the Patterson River. Currently, after leaving the existing road, hikers must find their own way through the woods while paralleling the river. There is potential to develop a trail along the south side of the river so hikers could follow a trail instead of hiking cross-country.

The road on the north side of the Patterson River has been kept open by hikers and moose hunters. In the spring of 1998, the roads on state lands were brushed to improve hunter access and increase moose forage. About a mile of trail would be needed to connect the existing road to the upper Patterson River.

During scoping people indicated some disagreement on trail proposals. Some moose hunters are strongly opposed to increased trail access because it would concentrate hunters and could pose safety concerns, while other people favored trail access. No trails up the Patterson River are being recommended for development at this time.

### **Inventoried Roadless Areas**

All areas within the Tongass National Forest that are in an unroaded and essentially undeveloped condition were inventoried by the Forest Service and evaluated for Wilderness potential (Forest Plan EIS, Appendix C). The Spires Roadless Area of 538,670 acres overlaps the Crystal Creek project area (Figure 3-12). About 8 percent of this roadless area is within the Crystal Creek project area. Forest Plan direction allows roading and timber harvest within inventoried Roadless Areas if compatible with Land Use Designation. The inventoried Roadless Area within the Crystal Creek project area is within the Scenic Viewshed, Modified Landscape, and Timber Production LUDs which allow for timber harvest.

All the action alternatives would slightly decrease the size of the inventoried Spires Roadless Area. Of the action alternatives, Alternative 3 would have the most effect and Alternative 5 would have the least. The overall setting and character of the Spires Roadless Area would remain unchanged in all of the action alternatives.

### **Recreation Access**

All of the action alternatives include some road construction (Figures 2-2 to 2-5) and the reconstruction of Road 6256 paralleling the Muddy River. These roads add to the existing road system and provide additional public access in the Crystal Creek Project Area.

Alternative 1 would have no road construction or reconstruction. Alternative 1 would keep hunters more concentrated than the action alternatives. Alternatives 2, 3, and 6 provide more opportunities to disperse moose hunters. All the action alternatives include new road construction in the Ess Lake area. Alternatives 2, 3, and 6, include new road construction in the Crystal Creek drainage. Alternative 3 includes new road construction in the upper Muddy River area. Alternatives 2, 5, and 6 would build new road on the Point Agassiz Peninsula.

All but 2.5 miles of proposed new roads are planned to be closed after timber harvest in Alternatives 2, 5, and 6. All but 3.1 miles of new road will be closed in Alternative 3. The road into the Crystal Creek drainage would be closed to motorized access by the general public during and following timber harvest activities. With the exception of the Crystal Creek road which will be closed to vehicle access, some off-road vehicle use and foot traffic on the closed roads may occur. This increased access would accommodate recreational uses, such as hiking, mountain biking, hunting, and access to backcountry areas.





### **Wild and Scenic Rivers**

During the Tongass Land Management Plan revision process, several hundred rivers on the Tongass National Forest were evaluated for possible inclusion in the National Wild and Scenic Rivers System. The Patterson River was the only river in the project area found eligible for Wild and Scenic River status. The Forest Plan ROD, Appendix A-14, did not recommend the Patterson River for inclusion in the Wild and Scenic River system as seven other rivers in the Coast Range Geographic Province were recommended, providing adequate representation of this small river type.



Figure 3-12



-  Class I Streams, Lakes, Shoreline
-  Crystal Creek Project Area Boundary
-  Spires Roadless Area
-  Non-National Forest Lands

## Spires Roadless Area



Scale is 1 inch = 25703 feet

## Scenery

### Visual Priority Travel Routes and Use Areas

Visual Priority Travel Routes and Use Areas (Forest Plan F-3 and F-4) identify viewing locations from which scenic impacts are assessed. Areas visible from Visual Priority Travel Routes and Use Areas are called “seen.” “Seldom-seen” areas are not viewed from priority travel routes and use areas. “Viewsheds” represent the entire visible or seen area from any position along a priority travel route or use area.

The Visual Priority Travel Routes and Use Areas from which the project area can be seen are Frederick Sound, Thomas Bay, and other viewing locations that look across these two bodies of water (Figure 3-13). Frederick Sound and Thomas Bay have been used as viewing positions for the purposes of scenic assessment.

The majority of the seen area is within the Forest Plan Scenic Viewshed Land Use Designation. In areas managed as Scenic Viewshed, seen areas will have a natural-appearing landscape. Planned timber harvest units will typically be small and affect only a minor percentage of the viewshed. Roads, facilities, and other structures are either not visible or subordinate to the landscape. Seldom-seen areas may be more extensively modified.

### Adopted Visual Quality Objectives

Visual Quality Objectives (VQOs) refer to the degree of acceptable alterations of the landscape. Adopted VQOs are the Forest Plan management direction as described below.

**Retention:** Changes in the landscape must not be evident to the casual forest observer. Modifications must repeat form, line, color, and texture found in the surrounding natural landscape.

**Partial Retention:** Changes in the landscape may be evident, but are subordinate to the surrounding landscape. Activities may introduce form, line, color, and texture not common in the surrounding landscape, but they should not attract attention.

**Modification:** Changes in the landscape may dominate the surrounding natural landscape, however they must repeat the naturally established elements of form, line, color, and texture to appear compatible with the surrounding natural landscape.

**Maximum Modification:** Management activities may dominate the surrounding natural landscape, yet when viewed in the background activities appear as natural occurrences within the landscape.

The percent of the project area in each VQO are shown in Table 3-27.

**Table 3- 27. Adopted Visual Quality Objectives in the Project Area**

| <u>Visual Quality Objective</u> | <u>Percent of Project Area</u> |
|---------------------------------|--------------------------------|
| Retention                       | 10%                            |
| Partial Retention               | 30%                            |
| Modification                    | 33%                            |
| Maximum Modification            | 27%                            |

Retention VQO applies primarily to the beach fringe and no harvest is proposed for these areas. Headlands and ridge faces beyond the shorelines of Thomas Bay and Frederick Sound viewed from up to five miles away are identified as Partial Retention. The interior slopes of the upper Muddy River drainage have an Adopted VQO of Modification. Most of the seldom seen area in the Crystal Creek and upper Patterson River drainages and the remainder of the Muddy River drainage have an Adopted VQO of Maximum Modification.

## Effects of the Alternatives by Viewshed

The Visual Quality Objectives of Retention and Partial Retention are achieved under all action alternatives because a natural or near natural appearing character is maintained.

None of the proposed alternatives would have a significant scenic impact as viewed from the entrance to Thomas Bay, Bock Bight, the saltwater channel east of Ruth Island, the saltwater channel west of Ruth Island, and saltwater areas near the mouth of the Patterson River. Visual contrast between the proposed harvest activity and the natural landscape would be reduced by the limited number of units, the size of harvest units and silvicultural treatments, the distance at which they are observed, and screening by foreground vegetation.

**Table 3- 28. Seen Area Harvested As Viewed from Priority Travel Routes and Use Areas**

|   | Alt. 1 | Alt. 2 | Alt. 3 | Alt. 5 | Alt. 6 |
|---|--------|--------|--------|--------|--------|
| Acres of seen area                        | 15,500 | 15,500 | 15,500 | 15,500 | 15,500 |
| Acres of seen area proposed for harvest * | 0      | 150    | 127    | 147    | 150    |
| Percent of seen area proposed for harvest | 0      | 1%     | 0.8%   | 0.9%   | 1%     |

\* Efforts were made to make the seen harvest units blend with the landscape.

## Frederick Sound Viewshed

### *Alternative 1*

No units are proposed for harvest under Alternative 1. Almost the entire viewshed currently exists in a natural appearing condition. Those areas appearing heavily altered are located in the Muddy and Patterson River areas, which are not visible from most locations in Frederick Sound. However, these areas can be seen from the south end of Thomas Bay. The scenic condition would improve as a result in continuing growth of vegetation.












### *Alternatives 2 and 6*

Six units are expected to be within view from the Alaska Marine Highway and other areas of Frederick Sound in the background distance zone. None of these units would be evident from Petersburg. All units should appear natural as seen from the Frederick Sound viewshed. Portions of units 23, 29, 32, and 35 located near Ess Lake and units 44 and 45 located mid-slope near the mouth of Crystal Creek may be evident from various locations.



Figure 3-13  
Areas Visible from Priority  
Travel Routes and Use Areas

# Legend

-  Seen Area
-  Crystal Creek Project Area Boundary
-  Existing Permanent Roads
-  Existing Closed Roads
-  Shoreline, Lakes, Class I/II Streams
-  500-ft. Contours
-  Existing Managed Stands
-  Saltwater
-  Wilderness
-  Non-National Forest Lands
-  Log Transfer Facility (LTF)



0 7920 15840

Scale is 1 inch = 7920 feet

map: g:\projects\crystal\plots\feis\plots\seenarea.map 10/20/98  
macro: feismap.mxd, seenarea.mxd



*Alternative 3*

Alternative 3 has slightly more harvest area visible in the Ess Lake area, but none near the mouth of Crystal Creek. Units 13, 17, 29, and 37 in the Ess Lake area are group selection harvest units and would likely not be visible to most observers. Unit 43, which is a gap phase harvest would also not likely be visible. Units 23, 32, and 35 which are clearcut with reserves would be more apparent to observers but would achieve the Partial Retention Visual Quality Objective.

*Alternative 5*

Portions of Units 17, 30, 33, 44, and 45 may be visible from Frederick Sound. Units 17 and 45, which are group selection, will be less evident than the others which are clearcut with reserves units. All units have been designed to meet the Partial Retention Visual Quality Objective.

**Thomas Bay Viewshed***Alternative 1*

No units are proposed for harvest under Alternative 1. The most highly evident visual impacts in the Thomas Bay area are three older clearcuts located just south of the Cascade Creek cabin. Other heavily altered areas beyond the foreground are located in the Muddy and Patterson River drainages and generally not visible from locations in Thomas Bay. The scenic condition would improve as a result of continuing vegetation growth.

*Alternatives 2 and 6*

Units 23, 25, 29, 30, 31, 32, 35 and 85 may be visible in the middleground distance to varying degrees near the mouth of the Patterson River. Little visibility of these units is anticipated in other locations. Units 23, 31, and 32 are proposed as group selection harvest and would likely not be evident to most people. Units 25, 29, 30, 35, and 85 are small clearcuts with reserves and would be slightly noticeable. All units are designed to meet the Retention or Partial Retention VQO. Other units, located on the Point Agassiz peninsula or in the Muddy River drainage, are not expected to be evident.

*Alternative 3*

Units 13, 17, 23, 29, 32, 35, 37, and 43 may be visible to varying degrees near the mouth of the Patterson River. Little visibility of these units is anticipated in other locations in Thomas Bay. Units 13, 17, 29, 37, and 43 are proposed as group selection harvest and would not be evident to most people. The remaining units are small and proposed for clearcuts with reserves. These three units are partially screened from view and would only appear slightly visible. All units have been designed to achieve the Retention or Partial Retention Visual Quality Objective.

*Alternative 5*

This alternative proposes to harvest seven units in the middleground viewing area of Thomas Bay, visible near the mouth of the Patterson River. Units 13, 17, and 31 are proposed as group selection harvest and Units 25, 30, 33, and 85, are proposed as clearcut with reserves. It is expected that the group selection harvest would not be evident to most people. The clearcut with reserves units are small and would appear only slightly evident. All units have been designed to meet Retention to Partial Retention Visual Quality Objective.

**Other Viewing Locations**

Other viewing areas include those not identified as visually sensitive or seen from established Visual Priority Travel Routes and Use Areas. Although not frequently viewed,



these other locations may be affected by timber harvesting activities. Generally these areas cannot be seen from saltwater travel routes and use areas and are visited by recreationists, hunters, subsistence users, and Point Agassiz residents. These locations are classified as “seldom-seen” and are managed with less visual emphasis than those areas with higher sensitivity.

Alternative 3 does not propose any units on the Point Agassiz Peninsula nor along the road to the residences. Alternatives 2 and 6 propose new road construction west of the existing LTF site to access proposed units. The likely visual impact of harvest from the new road location would range from a Modification to Maximum Modification VQO. Alternative 5 proposes partial construction of the road west of the existing LTF to access two units. Alternatives 2, 5, and 6 propose varying degrees of harvest on the road to the Point Agassiz residences. The harvest would be partially to fully visible and meet Modification VQOs.

All action alternatives propose varying degrees of harvest in the Muddy River drainage. Alternatives 2, 3, and 6 propose new road construction and harvest in the Crystal Creek drainage with similar visual impact. The effects of the units proposed on the west side of Crystal Creek as viewed from Road 6106 are likely to result in a Maximum Modification VQO. No alternatives propose harvest visible from the river in the upper Patterson River drainage.

### **Cumulative Effects**

#### **Thomas Bay Viewshed**

Past timber harvest in the Thomas Bay viewshed is isolated to an area near the mouth of the Patterson River where several large units logged in the 1960’s and a barge facility are evident. This project proposes smaller openings where group selection, single tree selection, and reserve trees in clearcuts will minimize the overall impacts upon scenery. This will help maintain a natural appearing character throughout the rotation.

#### **Frederick Sound Viewshed**

Very little evidence of past timber harvest is seen from Petersburg, or from Alaska Marine Highway ferries, cruise ships, and other boats in Frederick Sound. The natural appearing character of the Frederick Sound viewshed will be maintained as a result in all action alternatives.

### **Mitigation Measures**

The proposed units were designed to maintain scenic quality. Group selection and reserve trees in clearcuts were prescribed to limit unit visibility from key viewing locations. Some harvest units were deferred from harvest in this project because they would create a cumulative amount of scenic impact and could not be otherwise mitigated. Unit boundaries will be shaped or feathered to blend into the surrounding landscape. Although not a specific mitigation measure for scenery, riparian and beach buffers help screen areas of harvest from view and provide color and texture to reduce visual contrast.

## Issue 5 - Transportation

The Thomas Bay road system is not connected to any towns or villages. Some roads go through sections of private and State owned lands. There are approximately eight full time and several summer residents in the area, who regularly use the existing roads for subsistence and recreation purposes. Access to these roads from Petersburg and other outside areas is by float plane or boat. Currently, there are no publicly maintained trails, docks, or float plane facilities in the Crystal Creek Project Area.

### Existing Roads

The existing road system within the project area includes approximately 28.4 miles of permanent road and approximately 28 miles of temporary road. Of these miles, approximately 17.2 miles of permanent road are open and 16.0 miles of temporary road are open.

Forest roads are classified as either Forest Development Roads (permanent roads) or temporary roads. Forest Development Roads are hereafter referred to as "permanent" roads. Permanent roads are developed and operated for long-term resource management purposes. These roads receive constant or intermittent use depending upon the timing of timber harvest. The permanent roads form the primary transportation network in the project area. Some roads are being kept open by local residents to facilitate hunting and other uses. This document proposes a road management plan for the project area. The Road Management Objectives for each proposed road are described in Appendix A.

**Table 3- 29. Existing Permanent Roads in the Crystal Creek Project Area.**

| Road Number | Road Name       | Total Length<br>(miles) | Open Road<br>(miles) |
|-------------|-----------------|-------------------------|----------------------|
| 6100        | Mud             | 3.0                     | 3.0                  |
| 6101        | Patterson River | 3.5                     | 3.5                  |
| 6103        | Pirate's Peak   | 3.9                     | 0                    |
| 6252        | Point Agassiz   | 4.1                     | 4.1                  |
| 6256        | Muddy River     | 13.9                    | 6.6                  |
|             | <i>Total</i>    | <i>28.4</i>             | <i>17.2</i>          |

A temporary road is a short-term road developed and maintained for a limited time period. Current timber sale contracts require closure of these roads. This is an erosion control obligation of the timber buyer and cannot be waived. Closure is achieved by blocking access, removing all culverts and bridges, restoring the natural surface drainage patterns and putting the roadway back into vegetative production within 10 years.

There are approximately 28 miles of temporary roads. While some of these roads were closed after harvest was completed, many are still being used today. There are about 16.0 miles of open temporary roads from earlier timber sales. All alternatives, including Alternative 1, plan that 6.6 miles of open temporary roads will be closed. The remaining temporary roads are not causing resource damage and are used by the public. These roads will remain open and will be converted to permanent road status.

## New Road Development

The action alternatives propose new roads for timber harvest access. Alternative 5 would construct the least amount of road and Alternative 2 would build the most. All new permanent roads constructed will be closed after timber harvest except about 1.15 miles of Road 44900. All new temporary roads will be decommissioned. Approximately 2.2 miles of existing Road 6256 will be decommissioned to avoid further erosion by the Muddy River and replaced with a 1.6 mile reroute.

In addition, a motorized vehicle closure to public access at the proposed Muddy River crossing by Crystal Creek is planned in Alternatives 2, 3, and 6. This closure will be in effect during and after timber harvest and is designed to reduce impacts to goats in the Horn Cliffs area and the risk of over harvesting wolves.

**Table 3- 30. Proposed and Existing Open Road Miles**

| Alt | Miles of Open Existing Permanent Road | Miles of Open Existing Temporary Road to be Closed | Miles of Temporary Road Converted to Open Permanent Road | Miles of Proposed New Permanent Road | Miles of Proposed New Temporary Road | Miles of New Permanent Road Open After Harvest | Total Miles of Permanent Road Open After Harvest |
|-----|---------------------------------------|--|--|--------------------------------------|--------------------------------------|--|--|
| 1   | 17.2                                  | 6.6  | 9.4  | 0                                    | 0                                    | 0  | 26.6   |
| 2   | 17.2                                  | 6.6  | 9.4  | 15.6                                 | 6.7                                  | 2.5  | 29.1   |
| 3   | 17.2                                  | 6.6  | 9.4  | 11.5                                 | 4.6                                  | 3.1  | 29.7   |
| 5   | 17.2                                  | 6.6  | 9.4  | 6.5                                  | 8.0                                  | 2.5  | 29.1   |
| 6   | 17.2                                  | 6.6  | 9.4  | 14.9                                 | 6.8                                  | 2.5  | 29.1   |

## Log Transfer Facility (LTF)

Prior to 1978, nearly 160 million board feet of timber passed over the existing log bulkhead. Since then, less than one million board feet of timber has passed over the LTF at Thomas Bay. Underwater surveys done in September 1983 showed a small deposit of bark and wood debris. Dives in 1990 and 1997 reported little wood debris. In addition, field surveys did not locate any other acceptable sites for LTF construction. Therefore, reconstruction of the existing log transfer facility and gravel barging operation at Thomas Bay is included in all action alternatives (Appendix A).

## Right-of-Way from the State of Alaska

Approximately 0.3 mile of right-of-way may be needed from the State of Alaska for proposed FDR 44900.



## Other Environmental Considerations

There were many concerns raised during public scoping that are not significant issues because they are mitigated in the same way in all alternatives or are not significantly affected by any proposed activity.

### Air Quality

Emissions expected from implementing any of the action alternatives would be of short duration and are not expected to exceed State Ambient Air Quality Standards (Alaska Administrative Code, Title 18, Chapter 50).

### Soils and Hydrology

#### Soil Productivity

Tree growth, wildlife, and fish habitat are associated with soil productivity, which is the ability of a soil to grow plants. Soil depth and internal drainage have a major influence on soil productivity. Well-drained soils normally have the highest productivity.

#### Soil Erosion

Most undisturbed soils within the project area are resistant to surface erosion. Thick vegetative cover and surface organic duff layers protect the soils. When mineral soil is exposed, surface erosion can occur. Surface erosion can occur along stream banks, snowslides, avalanche tracts, and within V-notches (incised channels on steep slopes).

Some landslides are found within the project area. Landslides can occur during or immediately after heavy rainfall when soils are saturated. Landslides usually occur on steep slopes that have soils with distinct subsurface slip planes. There is a large natural landslide on the mountainslope just to the east of the Muddy River. A landslide hazard inventory to describe the relative risk of landslides uses four classes (low, moderate, high, and extreme). The Forest Plan Standards and Guidelines take forested land on slopes over 72 percent out of the tentatively suitable forest timber base. Harvest can occur on slopes over 72 percent based on a site-specific analysis which shows slopes to be stable.

**Table 3- 31. Soil Hazard Classes**

| Potential Landslide Hazard | Acres  | Percent of Study Area |
|----------------------------|--------|-----------------------|
| Low                        | 31,998 | 50%                   |
| Moderate                   | 10,736 | 17%                   |
| High                       | 7,153  | 11.4%                 |
| Extreme                    | 13,720 | 21.6%                 |

In the action alternatives, some acreage on slopes exceeding 72 percent was included in proposed harvest units. These areas, even though they are located within unit boundaries, will be excluded from harvest unless further analysis during sale layout finds that these sites are stable. The steeper slopes are scattered and range from about 51 acres in Alternative 2 to about 195 acres in Alternative 3. Alternative 3 uses helicopter yarding on these slopes and no active landslides were observed in these proposed units. No roads were proposed on unstable soils in any alternative.

## Other Environmental Considerations

**Table 3- 32. Acres of Potential Extreme Landslide Hazard Soils Within Proposed Harvest Units**

|               | Extreme Landslide Hazard Soils |
|---------------|--------------------------------|
| Alternative 1 | 0 (acres)                      |
| Alternative 2 | 51                             |
| Alternative 3 | 195                            |
| Alternative 5 | 40                             |
| Alternative 6 | 51                             |

### Hydrology

The Crystal Creek Project Area incorporates most of the ice-free portions of the Patterson and Muddy River watersheds. Both rivers are fed by glacial melt. The water appears cloudy from the fine silts which have been ground from rocks underlying the glacier by the weight of advancing or receding ice. Both rivers also have non-glacial clear tributary streams which dilute the cloudy water, improving the water quality.

Both the Patterson and Muddy Rivers are classed as either active alluvial or glacial outwash channels. These channel types carry high volumes of bedload which deposit on point bars. The accumulation of these deposits causes active meandering and unstable channel banks.

Both rivers have had periodic flooding caused by ice dams formed downstream from the glacier face. When these ice dams break, large volumes of water, ice, debris, and rocks may cascade down the channel. These floods can wash away streamside forest and deposit large amounts of debris onto the flood plain and broad glacial outwash plain. Though this flooding has not occurred in recent years due to glacial retreat, it was common on the Patterson River as recently as 1972 according to local residents (Israelson personal communication with Doerr, 1996).

Peak flows may also occur as a result of rain on snow and glacial ice during the summer months. The volume of flow may be more than expected from rainfall alone since summer flow has already increased because of melting glacier ice.

Non-glacial tributary streams of both the Patterson and Muddy Rivers are confined by narrow valleys and exposed bedrock. Observation indicates that the tributary streams yield less than 50 percent of the total flow of either river. The 7,488-acre Crystal Creek watershed and the 1,648-acre Ess Lake watershed are the largest tributaries on the Muddy and Patterson Rivers, respectively. The 2,320-acre Bear Slough watershed, located on Point Agassiz Peninsula drains into Frederick Sound.

A total of 217 miles of stream channel have been mapped and classified within the Crystal Creek Project Area. The most common channel types are classed either as glacial outwash (Patterson and Muddy Rivers) or as high gradient contained channels found on hill or mountain slopes.

## Cumulative Effects

Scheduling of activities through time can have a great effect on how watersheds function. Watershed recovery following disturbance occurs at varying rates depending on precipitation, soil productivity, and the amount of disturbance. Watershed recovery following clearcut harvest takes from 10 to 30 years in the Pacific Northwest (Athman and McCammon, 1989).

The Forest Plan Standards and Guidelines allow up to 20 percent of a watershed to be in second-growth stands younger than 30 years without detailed watershed analysis (Forest Plan, Appendix J). It is assumed that at this harvest and/or natural disturbance rate that no significant changes in high or low flow will occur. No alternative proposes cumulative harvest of more than 10.9 percent of any watershed in the 30-year period beginning 1968. Units harvested prior to 1968 are considered recovered (Forest Plan Appendix J). This percentage includes all openings created by partial harvest and clearcut with reserves. Table 3-33 summarizes the past and proposed harvest distribution by alternative.

**Table 3- 33. Cumulative Acres and Percentage of Watershed Area in Second Growth Less Than 30 Years Old <sup>1</sup>**

|   | Watershed Acres | Alt. 1 | Alt. 2 | Alt. 3 | Alt. 5 | Alt. 6 |
|---|-----------------|--------|--------|--------|--------|--------|
| Entire Project (acres) <sup>2</sup>             | 64,200          |        |        |        |        |        |
| Proposed harvest and acres harvested since 1968 |                 | 1,622  | 2,351  | 2,302  | 2,122  | 2,300  |
| % of Area Harvested                             |                 | 2.6    | 3.7    | 3.6    | 3.3    | 3.6    |
| Patterson River (acres)                         | 11,332          | 118    | 124    | 129    | 132    | 124    |
| % of Watershed Harvested                        |                 | 1.0    | 1.1    | 1.1    | 1.2    | 1.1    |
| Ess Lake (acres)                                | 1,648           | 20     | 173    | 169    | 107    | 179    |
| % of Watershed Harvested                        |                 | 1.2    | 10.5   | 10.2   | 6.5    | 10.9   |
| Cedar Creek (acres)                             | 1,201           | 0      | 27     | 0      | 27     | 41     |
| % of Watershed Harvested                        |                 | 0      | 2.2    | 0      | 2.2    | 3.4    |
| Entire Patterson River Watershed                | 14,181          | 138    | 324    | 298    | 266    | 344    |
| % of Watershed Harvested                        |                 | 1.0    | 2.3    | 2.1    | 1.9    | 2.4    |
| Lower Muddy River (acres)                       | 7,439           | 165    | 321    | 261    | 238    | 303    |
| % of Watershed Harvested                        |                 | 2.2    | 4.3    | 3.5    | 3.2    | 4.1    |
| Upper Muddy River (acres)                       | 18,216          | 679    | 701    | 949    | 736    | 701    |
| % of Watershed Harvested                        |                 | 3.7    | 3.8    | 5.2    | 4.0    | 3.8    |
| Crystal Creek (acres)                           | 7,488           | 340    | 532    | 498    | 340    | 471    |
| % of Watershed Harvested                        |                 | 4.5    | 7.1    | 6.6    | 4.5    | 6.3    |
| Entire Muddy River Watershed                    | 33,143          | 1,184  | 1,554  | 1,708  | 1,314  | 1,475  |
| % of Watershed Harvested                        |                 | 3.6    | 4.7    | 5.1    | 4.0    | 4.4    |
| Bear Slough (acres)                             | 2,320           | 0      | 136    | 0      | 77     | 140    |
| % of Watershed Harvested                        |                 | 0      | 5.9    | 0      | 3.3    | 6.1    |
| Delta Creek (acres)                             | 6,247           | 55     | 55     | 55     | 55     | 55     |
| % of Watershed Harvested                        |                 | 0.8    | 0.8    | 0.8    | 0.8    | 0.8    |

<sup>1</sup> Includes all created openings and all acres harvested since 1968.

<sup>2</sup> Some areas in smaller watersheds are not included in the rest of the table but are included in the entire project area acres.



## Other Environmental Considerations

There are many mitigation measures that would protect watersheds including minimum of 1000 feet beach buffers in all alternatives. Old-growth Habitat reserve areas have been established in all alternatives. Forest Plan riparian management guidelines extend stream protection measures to include smaller streams which are not fish-bearing (Forest Plan, 4-53 through 4-73). No traditional clearcut logging is proposed. All units will have 15 percent or more of the trees retained. Individual tree mark and group selection units will retain from 40 to 90 percent of the trees.

All roads will have erosion-resistant rock surfaces. Full bench construction with end haul of excavated material will be done on steeper road sections. The number of proposed bridges and culverts differs by alternative (Table 3-34).

**Table 3- 34. Number of Stream Crossings by New or Reconstructed Roads**

| Watershed/Area Name | Stream Class <sup>1</sup> | Alt. 1 | Alt. 2 | Alt. 3 | Alt. 5 | Alt. 6 |
|---------------------|---------------------------|--------|--------|--------|--------|--------|
| Entire Project Area | I                         | 0      | 11     | 11     | 7      | 11     |
|                     | II                        | 0      | 3      | 4      | 0      | 3      |
|                     | III                       | 0      | 8      | 8      | 3      | 8      |
| Patterson River     | I                         | 0      | 0      | 0      | 0      | 0      |
|                     | II                        | 0      | 0      | 0      | 0      | 0      |
|                     | III                       | 0      | 0      | 0      | 0      | 0      |
| Ess Lake            | I                         | 0      | 2      | 2      | 1      | 2      |
|                     | II                        | 0      | 0      | 0      | 0      | 0      |
|                     | III                       | 0      | 3      | 2      | 3      | 3      |
| Cedar Creek         | I                         | 0      | 0      | 0      | 0      | 0      |
|                     | II                        | 0      | 0      | 0      | 0      | 0      |
|                     | III                       | 0      | 0      | 0      | 0      | 0      |
| Lower Muddy River   | I                         | 0      | 6      | 6      | 5      | 6      |
|                     | II                        | 0      | 2      | 2      | 0      | 2      |
|                     | III                       | 0      | 1      | 1      | 0      | 1      |
| Upper Muddy River   | I                         | 0      | 0      | 1      | 0      | 0      |
|                     | II                        | 0      | 0      | 2      | 0      | 0      |
|                     | III                       | 0      | 0      | 1      | 0      | 0      |
| Crystal Creek       | I                         | 0      | 2      | 2      | 0      | 2      |
|                     | II                        | 0      | 0      | 0      | 0      | 0      |
|                     | III                       | 0      | 4      | 4      | 0      | 4      |
| Bear Slough         | I                         | 0      | 1      | 0      | 1      | 1      |
|                     | II                        | 0      | 1      | 0      | 0      | 1      |
|                     | III                       | 0      | 0      | 0      | 0      | 0      |










<sup>1</sup>Class I - Anadromous Fishery (salmon or steelhead)

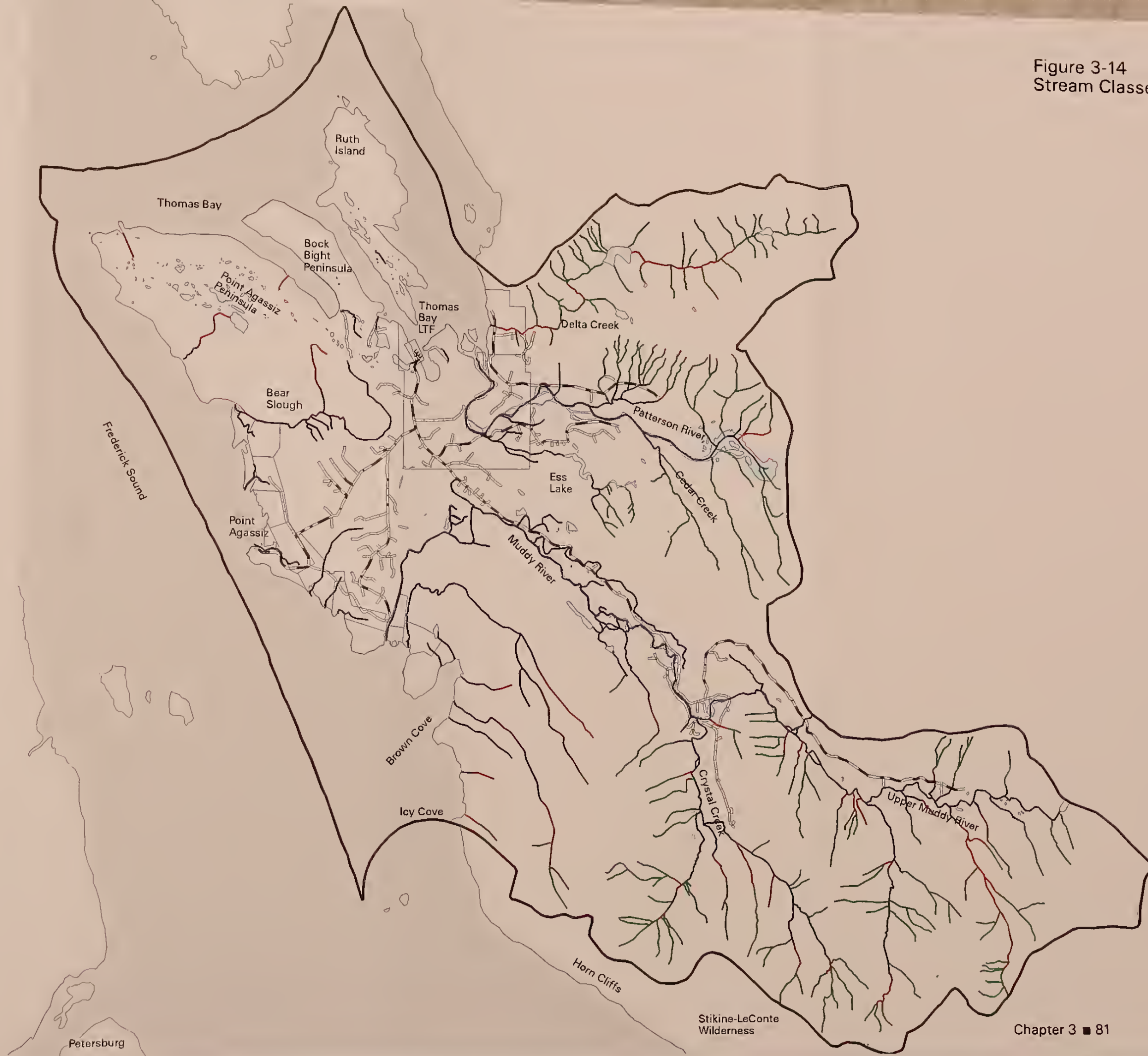
Class II - Resident Fishery (cutthroat trout and other resident fish)

Class III - Perennial Stream with active channel width greater than five feet.

All roads closed following timber sales will be left in a condition that will restore as much as possible the natural drainage patterns. To accomplish this, culverts and small bridges will be removed and/or waterbars will be constructed following harvest activities. Temporary bridges may be used instead of culverts at some sites to reduce impacts to fish migration and water quality. Bridge reuse at another site may prove to be more cost effective than installation and removal of culverts. Water quality and stream crossing costs will be monitored to evaluate this road management strategy.

Figure 3-14  
Stream Classes

- Legend**
-  Class I Streams
  -  Class II Streams
  -  Class III Streams
  -  Class IV Streams
  -  Crystal Creek Project Area Boundary
  -  Existing Permanent Roads
  -  Existing Closed Roads
  -  Lakes
  -  Saltwater







## Other Environmental Considerations

Areas of exposed soil will be mulched and/or planted to minimize any road related erosion. Needed erosion control measures and drainage improvement on existing roads will be undertaken as part of all action alternatives.

A log and rootwad structure will be constructed along a 600-foot stretch of the Muddy River where a meander has eroded toward a wetland area. The structure will help prevent further erosion. If the erosion is not stopped the meander may erode into the wetland area causing it to drain. The existing road will be rerouted in all action alternatives.

### Fisheries

Drainage basins within the Crystal Creek project area include:

- ♦ Patterson River (Alaska Department of Fish and Game #110-12-10070);
- ♦ Muddy River, (Alaska Department of Fish and Game #108-60-10030);
- ♦ Crystal Creek (Alaska Department of Fish and Game #108-60-10030-2022-3005);
- ♦ Delta Creek (No Alaska Department of Fish and Game Stream Number); and
- ♦ Bear Slough (No Alaska Department of Fish and Game Stream Number).

Other smaller streams have been grouped together for the fisheries analysis (Figure 3-14).

The Muddy River has several large tributaries that provide good salmon habitat. The main stem of the Muddy River is characterized by channel and streambank instability; considerable streambed gravel movement; braiding; instream organic debris; and a rather large flood plain. Because of high levels of glacial silt in the river, salmon are hard to see so population estimates are not available.

Crystal Creek is clear and has excellent spawning gravels. A cascade and low waterfall is located approximately one mile from the confluence of the Muddy River. No anadromous fish have been found above the falls although resident Dolly Varden are present. The habitat above the waterfall is relatively steep and other barriers are present. Further analysis will be needed to determine the costs and benefits for providing anadromous fish passage at this waterfall. The tributaries flowing into the main forks of Crystal Creek are generally steep and not fish-bearing.

The Patterson River lacks large woody debris because the stream canopy is open, and the riparian vegetation is primarily alder. Due to high levels of glacial silt in the river, fish are hard to see so population estimates are like the Muddy River, not available.

The first tributary of the Patterson River drains Ess Lake, which is a rearing area for coho salmon and has a population of cutthroat trout. The lower part of this tributary has good spawning habitat. The area below the lake consists of a series of beaver ponds which form good rearing habitat for juvenile coho. A forty-foot waterfall blocks the ponds above Ess Lake and no fish have been found. The barrier is not a potential habitat enhancement project.

The second tributary enters the Patterson River from the north. The lower portion of this tributary provide fair spawning habitat with a small amount of rearing habitat. The upper parts become steep with little to no spawning and rearing habitat.

Cedar Creek is the third tributary of Patterson River. The lower tenth mile has gravel/cobble substrates that provide fair spawning habitat. Very little rearing habitat exists in these areas. A large barrier falls is located a half mile above the confluence, and no fish were observed above the barrier. The barrier is not a potential habitat enhancement project.

## Other Environmental Considerations

Delta Creek is located north of the Patterson River. This stream has very little anadromous fish habitat, with a moderately steep gradient, and is characterized by swift whitewater.

### Aquatic Habitat Management Unit (AHMU) Designation

Aquatic Habitat Management Units are mapping units that display an identified value for aquatic resources. The Forest Plan redefines the AHMU Handbook definitions for classes of streams and adds a fourth classification of streams and a non-stream class:

**Class I** - "Streams and lakes with anadromous or adfluvial fish habitat; or high quality resident fish waters listed in Appendix 68.1, Region 10 Aquatic Habitat Management Handbook (FSH 2609.24) June 1986; or habitat above fish migration barriers known to be reasonable enhancement opportunities for anadromous fish."

**Class II** - "Streams and lakes with resident fish populations and generally steep (6-15 percent) gradient (can also include streams from 0-6 percent gradient) where no anadromous fish occur, and otherwise not meeting Class I criteria. These populations have limited fisheries values and generally occur upstream of migration barriers or have other habitat features that preclude anadromous fish use."

**Class III** - "Perennial and intermittent streams with no fish populations but which have sufficient flow or transport sufficient sediment and debris to have an immediate influence on downstream water quality or fish habitat capability. These streams generally have bankfull widths greater than 5 feet and are highly incised into the surrounding hillslope."

**Class IV** - "Other intermittent, ephemeral and small perennial channels with insufficient flow or sediment transport capabilities to have immediate influence on downstream water quality or fish habitat capabilities. These streams generally are shallowly incised into the surrounding hillslope."

**Non-streams** - "Rills and other watercourses, generally intermittent and less than 1 foot bankfull width, little or no incision into the surrounding hillslope, and with little or no evidence of scour."

**Table 3- 35. Miles of Stream Classes**

| Stream            | Class I     | Class II    | Class III    | Class IV               | Total Miles  |
|-------------------|-------------|-------------|--------------|------------------------|--------------|
| Patterson River   | 10.6        | 1.1         | 21.6         | 0.0                    | 33.3         |
| Cedar Creek       | 0.8         | 0.0         | 6.5          | 0.0                    | 7.3          |
| Ess Lake          | 4.4         | 0.0         | 2.6          | 0.0                    | 7.0          |
| Muddy River       | 22.0        | 0.4         | 1.5          | 0.0                    | 23.9         |
| Upper Muddy River | 16.2        | 7.0         | 29.4         | 0.0                    | 52.6         |
| Crystal Creek     | 9.0         | 3.1         | 20.3         | 2.0                    | 34.4         |
| Bear Slough       | 7.0         | 1.4         | 0.2          | 0.0                    | 8.6          |
| Others            | 19.9        | 8.6         | 20.7         | 0.6                    | 49.8         |
| <b>Total</b>      | <b>89.9</b> | <b>21.6</b> | <b>102.8</b> | <b>2.6<sup>1</sup></b> | <b>216.9</b> |

<sup>1</sup> The GIS database is incomplete for Class IV streams.

## Channel Typing

Channel types that have similar features are arranged into process groups. These process groups reflect the stream channel features such as substrate, gradient, large woody debris, sideslope characteristics, and riparian vegetation. The process groups can be used to predict the physical response of the streams to different management activities. The Forest Plan Riparian Management standards and guidelines are based on these process groups. These Standards and Guidelines were used for unit and road design (Appendix A). Table 3-36 gives the total mileage of each process group by stream.

**Table 3- 36. Miles of Process Group in the Crystal Creek Project Area**

| Stream            | Flood Plain | Glacier Outwash | Alluvial Fan | Palustrine and Lake | Estuarine  | Moderate Gradient Mixed | Moderate Gradient Contained | High Gradient Contained | Total Miles  |
|-------------------|-------------|-----------------|--------------|---------------------|------------|-------------------------|-----------------------------|-------------------------|--------------|
| Patterson River   | 1.3         | 7.0             | 0.5          | 0.1                 | 0.4        | 1.6                     | 0.3                         | 22.1                    | 33.3         |
| Cedar Creek       | 0.4         | 0.0             | 0.0          | 0.0                 | 0.0        | 0.0                     | 0.0                         | 6.9                     | 7.3          |
| Ess Lake          | 1.2         | 0.0             | 0.0          | 3.5                 | 0.0        | 0.4                     | 0.0                         | 1.9                     | 7.0          |
| Muddy River       | 3.0         | 10.3            | 0.0          | 8.4                 | 0.0        | 0.3                     | 0.0                         | 1.9                     | 23.9         |
| Upper Muddy River | 2.6         | 9.3             | 0.9          | 0.4                 | 0.0        | 4.2                     | 0.0                         | 35.2                    | 52.6         |
| Crystal Creek     | 1.4         | 0.0             | 0.0          | 0.0                 | 0.0        | 6.4                     | 1.2                         | 25.4                    | 34.4         |
| Bear Slough       | 1.7         | 0.0             | 0.0          | 0.0                 | 0.7        | 1.5                     | 3.8                         | 0.9                     | 8.6          |
| Others            | 2.0         | 2.6             | 0.8          | 8.4                 | 6.4        | 5.1                     | 1.6                         | 22.9                    | 49.8         |
| <b>Total</b>      | <b>13.6</b> | <b>29.2</b>     | <b>2.2</b>   | <b>20.8</b>         | <b>7.5</b> | <b>19.5</b>             | <b>6.9</b>                  | <b>117.2</b>            | <b>216.9</b> |

## Riparian Management Areas

Riparian Management Areas are a combination of no harvest and windfirm buffers along all Class I, II, and III streams. The Tongass Timber Reform Act (TTRA) mandates the use of minimum 100-foot wide buffer strips along both sides of all Class I and Class II streams that flow directly into Class I streams. The Forest Plan prescribes further protection to streams by adding Riparian Management Area buffers of varied width depending on process group. Units were designed so that all Class I and II streams and their associated no-programmed-harvest buffers are outside of unit boundaries (Appendix A).

## Large Woody Debris

Large woody debris is important to high quality fish habitat. It decreases water velocity, filters sediment, creates pool habitats, and provides fish cover from predators. Retention of trees within Riparian Management Areas will provide a continued long-term source of large woody debris for all alternatives.



## Other Environmental Considerations

**Table 3- 37. Miles of Class I, Class II, and Class III Stream Buffers for each Alternative Adjacent or Within a Unit Boundary**

|                       | Alt. 1 | Alt. 2 | Alt. 3 | Alt. 5 | Alt. 6 |
|-----------------------|--------|--------|--------|--------|--------|
| Class I <sup>1</sup>  | 0.0    | 1.5    | 2.8    | 2.5    | 2.1    |
| Class II <sup>1</sup> | 0.0    | 0.7    | 1.2    | 0.0    | 0.5    |
| Class III             | 0.0    | 3.0    | 12.0   | 0.5    | 3.0    |
| Total Miles           | 0.0    | 5.2    | 16.1   | 3.0    | 5.6    |

<sup>1</sup>Units were designed so that all Class I and II stream no-harvest buffers were outside of unit boundaries.

### Fish Passage

Fish passage can be maintained through the use of properly designed culverts and bridges. Culverts are typically used for road crossings of smaller streams; bridges are used for larger streams and rivers. In the Crystal Creek Project Area, the use of temporary bridges instead of culverts is proposed for some small streams (Appendix A).

### Road Sediments

Some short-term sediment increases during road construction can be expected from each of the action alternatives but should be minimized with implementation of Best Management Practices. Long-term sediment increases from temporary roads are avoided by pulling drainage structures, waterbarring, and allowing road corridors to revegetate. Road maintenance will ensure that culverts on open permanent roads are clear of debris.

Road construction timing clauses will be used to protect streams during migration, spawning, and egg incubation. No stream crossing construction should occur in streams in close proximity to anadromous fish streams for:

- ♦ coho salmon areas from August 1 - June 15;
- ♦ pink and chum salmon areas July 15 - May 15; and
- ♦ steelhead areas March 1 - July 18 (Alaska Department of Fish and Game, 1993).

Because of overlapping timing clauses, a compromise was developed which permits instream activities from May 15 to August 15 for areas needing timing clauses. Timing clauses for each road were determined cooperatively by fisheries biologists from the Alaska Department of Fish and Game and Forest Service.

### Temperature

By leaving a Riparian Management Area along streams, no thermal increases are expected in Class I, II, and III streams.

### Cumulative Effects

No impacts to fish populations resulting from the Crystal Creek timber harvest are expected with the recommended mitigation measures. Therefore, we do not expect that other species that depend on fish, such as bald eagles and river otters, to have a reduced prey base as a result of this project.

## Heritage Resources

### Past Cultural Environment

Oral tradition and ethnographic accounts name the Tlingit Indian as the dominant Native people who resided in the region from Yakutat Bay south to Dixon Entrance (Arndt et al. 1987:88). Their social structure is composed of a number of kwans that refers to people living within fluctuating geographic areas. Clans are smaller and apparently more important political divisions within each kwan. Each clan is associated with hunting, fishing and berry picking territories, sets of personal names, legends of origin and migration, songs, dances, ceremonial objects, and family crests. (Olson 1967:1)

Historic activity in the project area is diverse and includes trapping, hunting, mining, commercial fishing, recreation, logging and permanent settlement. The earliest historically documented use of the area indicates the Gardner Shrimp Company operated on Ruth Island from 1916 to 1918. Around this time period, there was a non-Native settlement of approximately 45 residents on the Point Agassiz Peninsula.

### Investigation for this Project

The cultural resource evaluation of the Crystal Creek Project Area began by researching various historical and ethnographic accounts, previous cultural resource surveys, Alaska Heritage Resource Survey (AHRS) listings, Stikine Area files and atlases, special use permit files, land status atlases, and a fur farm index (Roberts n.d.). Informal interviews were conducted with Point Agassiz, Petersburg, and Kake residents. Public comment was encouraged at scoping meetings held in Petersburg and Kake. A questionnaire available at the meetings elicited information about known or suspected cultural resources in or near the project area.

Forest Service archaeologists conducted five cultural resource surveys in the project area and one survey just outside the area between 1976 and 1991. Survey methods varied from selective visual reconnaissance to complete ground coverage with subsurface testing. All work was initiated in compliance with Section 106 of the National Historic Preservation Act. Formal documentation about the surveys and results are filed at the Stikine Area Supervisor's Office in Petersburg, Alaska. Some information pertaining to identified cultural resources is restricted from public access due to its sensitive and non-renewable nature.

The cultural resource survey strategy follows stipulations set forth in a Programmatic Agreement (1995) with the Forest Service, Alaska Region, the State Historic Preservation Officer and the Advisory Council on Historic Preservation. The stipulations were met to satisfy the Forest Service's Section 106 responsibilities of the National Historic Preservation Act. Archaeologists discovered thirteen new AHRS sites in the project area including a contemporary period cabin, a contemporary camp, a historic period trail, a historic shelter, a historic period mine and structure complex, six prehistoric shell middens, one petroglyph site, and a rock formation of undetermined affiliation. Field crews also discovered some previously undocumented petroglyphs and added them to a site with existing documentation. Of the total, eight sites (five prehistoric middens, one historic shelter, two petroglyph sites) appear to meet National Register of Historic Places eligibility criteria. Culturally modified trees were recorded; none appear to meet National Register eligibility criteria. No known sites are in areas proposed for timber harvest and associated ground disturbing activities.

All of the information is detailed in a report submitted to the Alaska State Historic

## Other Environmental Considerations

Preservation Officer. The conclusions state that none of the cultural resources identified in the project area will be impacted by the proposed alternatives. The Section 106 consultation process was completed and the Alaska State Historic Preservation Officer and the Advisory Council on Historic Preservation concurred with our findings and recommendations. Some undiscovered sites may exist in the project area. If a new site is discovered, it will be evaluated by a professional archaeologist. Mitigation plans will be initiated prior to any work that may adversely affect the resource.

### Cumulative Effects

Continued surveys and various mitigation measures will reduce the potential loss by preserving and documenting significant sites and by providing data about un preservable sites. Periodic monitoring of road construction and timber harvest may identify newly exposed sites and assess any damages. Threats to significant cultural resources include development, decay, natural landscape changes such as erosion and windthrow, and increased visitation. Beach fringe, stream and estuary buffer zones will reduce possible impacts to cultural resources. Increased site access may result in cultural resource losses, vandalism, or looting.

### Karst and Caves

No rocks associated with karst formation, such as limestone or dolomite, were found. There is no evidence of karst development or caves anywhere within the project area.

### Lands

There are approximately 2600 acres of State land and 1130 acres of private ownership within the study area. The State land is located adjacent to Thomas Bay surrounding the mouth of the Patterson River. The private ownership roughly parallels the shoreline near Point Agassiz. Most of the State land has second-growth timber stands; some of which are recently thinned. The private ownership is mostly wet meadows which were used for agricultural purposes at the beginning of the 1900's. Several families live there year-around.

Two of the existing roads that may be used for hauling timber, Road 6100 and Road 6252, are used by residents. No timber hauling will occur across private land. Timber hauling that occurs across State land is allowed due to acquired right-of-ways. These roads as well as other mainline roads will be signed for safety purposes. All existing roads will be designated as "Keep Open" roads in the timber sale contract to minimize disturbance to travel by residents and visitors. Alternative 1 would have the least effect on residential travel. Of the action alternatives, Alternative 3 would have the least effect since no timber haul is planned for Road 6252 and Road 6100. Alternative 5 has the most impact since a number of units are adjacent to these roads.

Although all but 2.5 miles of proposed new roads are planned to be closed after timber harvest, access to other areas will be possible during the period of sale operations which may be several years. An exception to this will be the Crystal Creek drainage which will be closed to public motorized traffic at all times. While the roads are open, roaded recreation experiences will be enhanced.

### Minerals

There are two mining claims in the project area. At this time, neither of the mining claims have an approved Plan of Operation. This Plan of Operation would include mitigation measures to limit resource impacts.



## Subsistence

With the passage of the Alaska National Interest Lands Conservation Act (ANILCA), the U.S. Congress recognized the importance of subsistence resource gathering to the rural communities of Alaska. ANILCA (16 USC 31130) defines subsistence as:

“The customary and traditional uses by rural Alaska residents of wild, renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools or transportation; for the making and selling of handicraft articles out of non-edible byproducts of fish and wildlife resources taken for personal or family consumption; and for customary trade.”

ANILCA provides for the continuation of the opportunity for subsistence uses by rural residents of Alaska, including both Natives and non-Natives, on public lands. It also legislates that customary and traditional subsistence uses of renewable resources shall be the priority consumptive uses of all such resources on the public lands of Alaska. Non-rural residents are not provided a preference for the taking of fish and wildlife on public lands. Juneau and Ketchikan are the only communities in Southeast Alaska that have been determined to be non-rural by ANILCA and the Federal Subsistence Board.

Moose have recently been identified as a subsistence species within the project area by the Federal Subsistence Board. The effects of the alternatives on moose habitat and harvest have been discussed under Issue 2.

## Community Subsistence Profiles

### Petersburg

Petersburg is situated on the northwest shore of Mitkof Island at the north end of Wrangell Narrows, approximately ten miles from the Crystal Creek Project Area. Per capita income for Petersburg residents in 1987 was reported as \$12,602 (Kruse and Frazier, 1988). Approximately 14 percent of the population are Native Americans (Alaska Department of Fish and Game, 1989). Prior to white settlement, the Petersburg area was used for seasonal fishing camps by Native Americans. Founded by Norwegian Peter Buschmann in 1899, Petersburg was incorporated in 1906. More Norwegians followed and created a Scandinavian-style community. Petersburg grew around a cannery, and the site quickly became a center for fishing, fish processing, and transportation. Except for a slight decline in the 1950s, a continual growth in population has occurred. The 1990 census population of Petersburg was 3,207 people.

Petersburg is highly dependent on seafood harvesting and processing. A number of fish, shrimp, and crab canneries have operated in Petersburg and Scow Bay over the years. Petersburg is home port to the largest salmon purse seining fleet in Southeast Alaska. Halibut has also been central to the local fishing industry because it provided regular employment through the winter months. Approximately 37 percent of the households fished commercially in 1987 and 12 percent of all fish used by households was retained from commercial catches (Alaska Department of Fish and Game, 1992a).

Government employment in Petersburg accounted for 35 percent of the wage income in 1986. The government sector has been declining through the late 1980s and early 1990s. Other economic sectors include retail trade, construction, timber, and tourism. Large scale logging was introduced to the area in the 1960s (Alaska Department of Fish and Game, 1992a).

## Other Environmental Considerations

**Table 3- 38. Subsistence Resource Use by Project Area Communities.**

| Resources            | --Pounds per Household-- |          |
|----------------------|--------------------------|----------|
|                      | Petersburg               | Wrangell |
| All Resources        | 667                      | 460      |
| Fish                 | 300                      | 206      |
| Salmon               | 151                      | 85       |
| Other Finfish        | 149                      | 121      |
| Game                 | 209                      | 105      |
| Deer                 | 146                      | 57       |
| Bear                 | 5                        | 8        |
| Moose                | 58                       | 35       |
| Marine Mammals       | 0                        | 20       |
| Birds                | 18                       | 6        |
| Marine Invertebrates | 115                      | 115      |
| Plants and Berries   | 24                       | 9        |

Source: Alaska Department of Fish and Game, 1992a

The subsistence resources most commonly used by Petersburg residents are coho and chinook salmon, halibut, and deer. Crab, shrimp, berries, and wood are also important. Subsistence harvest provides just over 30 percent of the meat and fish for Petersburg residents (Kruse and Muth, 1990).

Harvest of land mammals by Petersburg residents consists primarily of deer, which are accessed mostly by boat and foot. Where logging roads are present, hunters often use all-terrain vehicles or hike on roads (Alaska Department of Fish and Game, 1992b).

### Wrangell

Wrangell is located approximately 33 air-miles south of Petersburg on the northern tip of Wrangell Island. It is approximately 40 miles from the Crystal Creek Project Area. The 1990 population was reported at 2,479 people. Approximately 38 percent of the population is Native Alaskan. Per capita income of Wrangell residents in 1987 was reported at \$11,989.

The community began as an important Tlingit village primarily because of its proximity to the Stikine River. Wrangell Stikine Kwan clans held and fiercely defended a monopoly of trading rights along the Stikine River, which served as an important early trade route into the Canadian interior. The flags of three nations (England, Russia, and the United States) have flown over Wrangell. Wrangell became a supply center for gold miners and prospectors during a gold rush in 1862 and in the Klondike rush of the 1890s. Over the years several fish, crab, and shrimp canneries have operated near Wrangell (Alaska Department of Fish and Game, 1992a).

## Other Environmental Considerations

Today, timber, fishing, and fish processing dominate Wrangell's economy. Approximately 19 percent of Wrangell households fished commercially in 1987. Commercial fishing contributes significantly to the subsistence fish harvest because commercial fishermen generally have the skills and equipment to be successful in subsistence harvests. Also, deer are often hunted in areas remote from Wrangell not accessible by small boats. In Wrangell, approximately 16 percent of all fish used by households in 1987 was retained from commercial catches (Alaska Department of Fish and Game, 1992a).

Timber eventually surpassed fishing in Wrangell's economic history, and by 1987 government was the third major employer after timber and fishing (Alaska Department of Fish and Game, 1992a). Wrangell has a full-time U.S. customs agent to handle international trade. Tourism has been a growing economic sector in recent years. More than 18,000 tourists visited Wrangell in 1987.

### **Communities Traditionally Using the Crystal Creek Project Area**

Subsistence use areas and the levels of harvest were estimated from a variety of sources. Alaska Department of Fish and Game records the level of community harvests for select species, such as deer, marten, goat, black bear, wolf, and otter, within specific areas referred to as Wildlife Analysis Areas (WAAs). For the purpose of harvest reporting, VCUs 487 and 489, which comprise the project area, are contained within the Alaska Department of Fish and Game's Wildlife Analysis Area (WAA) 1605. WAA 1605 also contains VCU 488, which is outside the project area. However, since VCU 488 is largely an inaccessible glacier-dominated landscape which receives little hunting pressure, the reported harvest in WAA 1605 (Table 3-38) should closely correspond to the harvest within the project area.



## Other Environmental Considerations

**Table 3- 39. Comparison of Subsistence and Non-subsistence Harvest of Important Game Species<sup>1</sup> Within WAA 1605**

| Species    | Communities                     | Years   | Average Harvest <sup>2</sup> | Harvest Range            | % Total Harvest |
|------------|---------------------------------|---------|------------------------------|--------------------------|-----------------|
| Deer       | Subsistence<br>Petersburg       | 1987-95 | 47.8                         |                          | 98%             |
|            | Nonsubsistence<br>Alaska        |         | 1.0                          |                          | 2%              |
|            | <b>Total Deer Harvest</b>       |         | <b>48.8</b>                  | <b>16-85<sup>3</sup></b> | <b>100%</b>     |
| Goat       | Subsistence<br>Petersburg       | 1989-95 | 1.6                          |                          | 74%             |
|            | Nonsubsistence<br>Alaska        |         | 0.4                          |                          | 21%             |
|            | Nonresident                     |         | 0.1                          |                          | 5%              |
|            | <b>Total Goat Harvest</b>       |         | <b>2.1</b>                   | <b>0-7<sup>3</sup></b>   | <b>100%</b>     |
| Black Bear | Subsistence<br>Petersburg       | 1987-95 | 0.6                          |                          | 62%             |
|            | Nonsubsistence<br>Nonresident   |         | 0.3                          |                          | 38%             |
|            | <b>Total Black Bear Harvest</b> |         | <b>0.9</b>                   | <b>0-2<sup>3</sup></b>   | <b>100%</b>     |
| Wolf       | Subsistence<br>Petersburg       | 1987-95 | 1.3                          | 0-6 <sup>3</sup>         | 100%            |
| Otter      | Subsistence<br>Petersburg       | 1987-95 | 2.8                          | 0-10 <sup>3</sup>        | 100%            |
| Marten     | Subsistence<br>Petersburg       | 1987-95 | 11.6                         | 0-34 <sup>3</sup>        | 100%            |

<sup>1</sup>Moose harvest by community is in Table 3-9, under Issue 2.

<sup>2</sup>Source of goat, black bear, wolf, otter, and marten data is unpublished Alaska Department of Fish and Game harvest data (Crain 1996). Source of deer data is Alaska Department of Fish and Game (1996). The harvest within WAA 1605 should closely correspond to the harvest within the project area since little hunting and trapping is believed to occur in VCU 488.

<sup>3</sup>Range of annual harvests for the years shown.

Alaska Department of Fish and Game harvest data and Tongass Resource Use Cooperative Survey (TRUCS) maps reveal subsistence use areas for deer, marine invertebrates, marine mammals, salmon, and other fish within the project area. Other sources of subsistence use information came from public testimony and published accounts of community use surveys.

## Other Environmental Considerations

The information sources reveal that Petersburg residents use the Crystal Creek Project Area extensively for subsistence harvest, especially for deer, fish, crab and shrimp, and, to a lesser degree, goats, black bear, and furbearers. The area surrounding Horn Mountains which borders the south side of the project area is one of the most important goat hunting areas for the community of Petersburg. Residents of Wrangell also make limited use of the project area for hunting deer and marine mammals and fish extensively in the area. Little recent harvest within the project area was reported by Kake residents, although people reported that the area was formerly used by Kake for fish gathering, goat hunting, collecting goat hair, and fur trapping. Other rural southeastern Alaskan communities with some reported fish and wildlife gathering activities within the area, but not significant use, include Haines, Port Protection, Edna Bay, Sitka, and Coffman Cove.

### Types and Amounts of Resources Gathered

Subsistence resources most intensively gathered by the communities of Petersburg and Wrangell near the Crystal Creek Project Area are deer, salmon, halibut, and shellfish.

### Areas Most Often Used for Subsistence Activities

The most popular areas for subsistence fishing include the marine waters of Frederick Sound and Thomas Bay and the freshwater lakes, ponds, and streams within the project area. The tidal environments from Icy Cove north to the Point Agassiz Peninsula and along the north shoreline of the Point Agassiz Peninsula between Wood Point and Bock Bight, plus the waters of Thomas Bay, are used to gather marine invertebrates, primarily shrimp and crab. A commercial dungeness crab fishery occurs in the waters near the Patterson River, and it is likely that some subsistence crab harvest occurs there.

Deer, black bear, and furbearer hunting and trapping occurs throughout the project area along the existing road system, as well as the beach-fringe and inland forests. Ruth Island, Bock Bight Peninsula, Point Agassiz Peninsula, and the area south of the Muddy River to Icy Cove are all popular places to hunt for deer. Goat hunting occurs in the mountainous terrain throughout the area, with the most concentrated use being around Horn Mountains and Swan Lake outside the project area. Concern was expressed that further roading in the Crystal Creek drainage would increase access to the Horn Cliff's goat population and could result in over harvest.

From 1987-95, residents of Petersburg gathered about 4.5 percent of their total deer harvest within the project area (Alaska Department of Fish and Game 1996). This hunting resulted in an estimated harvest of 49 deer/year average in WAA 1605 during those years, nearly all by Petersburg residents. TRUCS data indicate that Petersburg residents hunt extensively for deer throughout the project area, except for the very headwaters of Delta Creek, Crystal Creek, and the Muddy River.

An average of about two goats have been taken in recent years in WAA 1605, with 74 percent of the reported harvest by Petersburg residents (Table 3-38). An average of six goats (range 3-14) have been taken each year since 1988 in nearby WAA 1706 which includes the Horn Cliff's goat population (Crain 1996) with 71 percent of these hunters from Petersburg. Currently, Petersburg hunters access the Horn Cliff's area from Frederick Sound, but concern was expressed that bridging across the Muddy River and roading in the Crystal Creek drainage would provide roaded access to the Horn Cliff's goat herd.

## Other Environmental Considerations

Some fur trapping occurs within the study, mostly for marten (Table 3-38). Petersburg residents account for 100 percent of the reported harvest of marten, otter, and wolves since 1987. The black bear harvest is low, averaging only about one bear a year, with 100 percent of the reported subsistence harvest by Petersburg residents.

Subsistence fish and marine invertebrate use areas were derived largely from the TRUCS maps. The only reported subsistence marine invertebrate harvest areas within the project area were by residents of Petersburg. These areas include the tidal environments from Icy Cove to the Point Agassiz Peninsula and along the north shoreline of the Point Agassiz Peninsula between Wood Point and the mouth of Bock Bight, plus the waters of Thomas Bay north of Ruth Island. These areas are mostly used to harvest shrimp and crab. A commercial dungeness crab fishery also occurs in the marine waters near the mouth of the Patterson River, and it is likely that some subsistence crab harvest occurs here as well. Petersburg residents report using the marine waters of Frederick Sound and Thomas Bay extensively from subsistence salmon and other fish harvesting.

No deer harvest was reported by Wrangell residents within the project area from 1987-95 (Alaska Department of Fish and Game 1996); however, TRUCS data indicate that residents of Wrangell have reported hunting for deer in the project area. No goats have been reported harvested by Wrangell residents from 1989-95 within the project area or within the Horn Cliffs area to the immediate south of the project area. The area would not be considered an important deer or goat hunting area for residents of this community. No furbearer or black bear harvest has been reported by Wrangell residents within the project area in recent years (Alaska Department of Fish and Game 1996).

The TRUCS data indicate that some harvest of marine mammals by Wrangell residents has been reported to occur near the McDonald Islands, but none has been reported within Thomas Bay.

Subsistence fish and marine invertebrate areas were derived largely from the TRUCS maps. Wrangell residents report extensive use of the project area for harvesting salmon and other fish. Areas reportedly used by Wrangell residents include Thomas Bay, Frederick Sound offshore of the Muddy River and Brown Cove, the Patterson River drainage, the lower two miles of the Muddy River, Ruth Island, Bock Bight Peninsula, and various inland locations near Point Agassiz, Brown Cove, and the Thomas Bay log transfer facility.

## Environmental Consequences

### Abundance and Distribution of Deer

Deer are one of the most important subsistence resources for communities in Southeast Alaska (Alaska Department of Fish and Game 1989; Kruse and Muth 1990). The Crystal Creek Project Area provides about 5 percent of the deer for Petersburg residents.

The evaluation of deer is based on a comparison of supply and demand. A habitat capability model, developed as part of the Forest Plan and as applied in this analysis, provides an estimate of the potential number of deer available for harvest that the habitat within the project area can support over time. This equates to a potential supply available for subsistence use. The project area has a five month season with a two buck bag limit. The number of deer taken during this season provides an estimate of the demand for deer. If the demand for deer exceeds the supply, then a significant possibility of a restriction exists. We assume that approximately ten percent of the deer population can be harvested on a sustained basis if the population is near carrying capacity. Thus, the minimum number of deer needed in an area is approximately ten times the subsistence hunter demand for deer; otherwise, a restriction on subsistence hunting may ensue.



## Other Environmental Considerations

It is assumed that communities that currently use the project area for subsistence resources will continue to do so in the foreseeable future, if the area remains open for deer hunting. An estimated 49 deer have been harvested annually in WAA 1605 in recent years. Two percent of the total reported harvest in WAA 1605 was by residents of Haines, who do not have a subsistence priority in this portion of the mainland. No other community reported harvesting deer within WAA 1605 from 1987-1995 (Alaska Department of Fish and Game 1996).

Subsistence demand for deer was estimated by using the average harvest from 1987-1995 for WAA 1605 and assuming a 15 percent increase per decade, following human population projections given in the Forest Plan. By 2040, the subsistence demand is expected to be 94 deer, which, assuming a 10 percent harvest rate, would require a deer population of 940 deer. All alternatives are estimated to provide sufficient habitat to maintain a deer population in excess of 1,025 deer by 2040, using the most conservative estimates of densities with respect to habitat capability (Person et al. 1997). The amount of old-growth forest harvested by the alternatives is not expected to result in restrictions to sport or subsistence harvests of deer in the foreseeable future. Based on the habitat modeling analysis and the levels of subsistence deer harvest reported by Alaska Department of Fish and Game, this evaluation concludes that a significant possibility of a significant restriction on the subsistence use of deer is not likely under any of the alternatives (Table 3-38).

### Abundance and Distribution of Mountain Goats

The Crystal Creek Project Area and surrounding area is an important goat hunting area for residents of Petersburg. Slightly over 70 percent of the harvest has been by residents of Petersburg and the remainder has been by non-subsistence hunters from areas other than Petersburg.

Current harvests of mountain goats within the project area are low, despite the presence of high goat populations and extensive goat habitat. A yearly average of about two goats have been taken recently in the project area (Table 3-38). All action alternatives are expected to reduce goat carrying capacity by less than two goats which will not significantly affect the number of animals available to hunters. Some increase in goat harvest may occur due to improved access above Ess Lake and into the Upper Muddy River drainage. These areas appear to support large goat populations that are virtually unhunted. Therefore, a potential increase in goat harvest is not expected to be detrimental to the goat populations in these areas or to require restrictions in hunting seasons in any of the action alternatives.

Of greater concern is the Horn Cliffs goat population adjacent to the south side of the project area. In the past, there has been concern expressed that this population is being excessively hunted and, in the 1980's, goat hunting was briefly restricted to billy goats only to reduce the potential for over harvest. A concern was expressed that roading in the Crystal Creek drainage would result in harvest detrimental to the goat population.

Alternatives 1 and 5 would not construct any new roads into the Crystal Creek drainage. A motorized closure is proposed at the bridge crossing of the Muddy River into the Crystal Creek drainage in Alternatives 2, 3, and 6, officially closing the Crystal Creek drainage to motorized access by the public. A major reason for this proposed closure is to limit access to the Horn Cliffs goat population. In addition, logging roads would be closed after timber harvest, further restricting access. The shortest distance between the alpine habitat of Horn Mountains and present and proposed roads (including roads that would be closed after timber harvest) is 1.75 miles in Alternatives 1 and 5, 0.8 miles in Alternative 6, and 0.6 miles in Alternatives 2 and 3. The proposed road closure to motorized access should be an

## Other Environmental Considerations

effective method to prevent over harvesting of the Horn Cliff's goat population in all alternatives.

Goat harvests are monitored yearly by the Alaska Department of Fish and Game. If overhunting should become evident, further road access restrictions may be implemented. This evaluation concludes that a significant possibility of a significant restriction on the subsistence use of goats is not likely under any of the alternatives.

### **Abundance and Distribution of Furbearers**

Some fur trapping occurs within the project area, primarily for marten (Table 3-38). Petersburg residents account for 100 percent of the reported harvest of otter, marten, and wolves since 1987. Harvest of furbearers occurs both along the shoreline by people using boats for access, as well as along the existing road system. Seven percent of Petersburg households harvest furbearers (Kruse and Frazier, 1988).

Marten was chosen as a management indicator species for this analysis. The estimated marten habitat capability within the project area in 1954 was 116 animals. The estimated habitat capability at present is about 100 animals, a 14 percent reduction. The estimated reduction of marten habitat capability due to the action alternatives is one animal (a one percent reduction). Significant subsistence restrictions on marten are not expected as a result of any action alternatives proposed. Overall, the miles of roads maintained for motorized public access after the timber harvest is not expected to change significantly or to affect marten populations negatively.

### **Abundance and Distribution of Black Bear**

An average of one black bear is killed each year within the project area (Table 3-38). Historically, 62 percent of the reported harvest was by Petersburg residents, the remainder was by out-of-state hunters. Field observations indicate that black bears are common and well-distributed within the sale area. The habitat potential of the project area exceeds the ability to meet the current level of harvest and none of the alternatives are expected to result in any restrictions to subsistence harvest of black bears.

### **Access to Wildlife**

The primary modes of access for harvesting wildlife include boats, foot travel, cars, all-terrain vehicles, and bicycles. The existing logging roads have traditionally been used extensively for hunting.

Some people want roads maintained for access. Several people and agencies expressed concern that roading in Crystal Creek could result in the over harvest of the Horn Cliff's goat population.

Access by boat and foot is not expected to be restricted by any of the action alternatives. Access to areas along the beach fringe will not change. The IDT has developed proposed road management objectives that keep motorized access to about the current level. A posted motorized closure to public access would be established at the potential bridge crossing of the Muddy River into Crystal Creek in Alternatives 2, 3, and 6. Almost all newly constructed specified roads and all new temporary roads would be closed after the sale in all action alternatives. Alternative 5 would limit the amount of new road construction and concentrate timber harvest around the existing roads.

Approximately 6.6 miles of existing roads that are presently open will be closed (Appendix A). These roads did not have any sign of recent hunting and recreation use. Another 9.4

## Other Environmental Considerations

miles of open temporary roads are being used by the public and will be placed in a permanent road status. Subsistence access on these roads will not change. These closures should have no adverse effect on access by subsistence users.

In all action alternatives, there would be a short-term increase in motorized access and a long-term increase in foot access to the area surrounding Ess Lake. All action alternatives would result in some long-term increase in motorized access in the upper Muddy River drainage as a result of road reconstruction. Alternatives 2, 3, and 6 would result in long-term increases in foot access into the Crystal Creek drainage as long as the bridge crossing of the Muddy River remains. None of these increases in access are expected to significantly restrict or otherwise impact subsistence use of the project area.

### Competition for Wildlife

Competition is closely linked to access. Opening an area up by increasing access may be a favorable development for subsistence users who often depend on a road to transport their animals out of the field. On the other hand, that same increased access could mean increased competition for subsistence resources, and may be an adverse impact. Increased access can be considered favorable for subsistence users but may have a long term adverse impact for users if over harvesting occurs.

No logging roads are proposed on Ruth Island, Bock Bight Peninsula, most of Point Agassiz Peninsula, and in the area from Muddy River to Horn Cliff's facing Frederick Sound. In the remaining portion of the project area, use of roads for access is the common mode of transportation by hunters. Some increase in hunters would probably occur in all the action alternatives due to improved access. Much of the increase in hunting would be by other local subsistence hunters. Little if any increase in competition between rural and non-rural residents is expected as there is no transportation link to non-rural communities.

Temporary logging camps may occur at Thomas Bay. These workers could be local subsistence users or non-subsistence hunters. The road closure within the Crystal Creek drainage should minimize the likelihood of over harvest. Subsistence users would have the ANILCA preference over non-subsistence users if game populations were reduced to levels that required restrictions on harvests. No reductions in game populations or harvest restrictions are expected due to increased competition in any of the alternatives. Changes in harvest rates of goats, moose, deer, marten, and wolves will be monitored to determine if over harvesting is occurring and harvest restrictions are needed.

### Abundance and Distribution of Fish and Shellfish

Figure 3-14, shows the general location of the fish habitat in the project area. Alternative 5 would present the fewest impacts to streams and fish because it has the fewest number of road crossings. The risk of impact to fish populations due to timber harvest would be minimal because of TTRA stream buffers, Forest Plan riparian standards and guidelines, and road construction BMPs.

There are no expected measurable effects on shellfish populations for all action alternatives. The Thomas Bay LTF would present the greatest potential for adverse impacts to shellfish. A dive conducted in 1997 found minor amounts of bark accumulation at the LTF, 20 years after most logging occurred.



# Other Environmental Considerations

## Access to Fish and Shellfish

Roading associated with timber harvest will increase access to streams but not shorelines in the project area. Because timber will be harvested on uplands and away from shorelines, access to historic saltwater fish and shellfish areas should not be affected in the near or foreseeable future.

## Competition for Fish and Shellfish

Competition for fish is not expected to increase due to the Crystal Creek timber harvest. Fishing and shellfish gathering occurs primarily from boats and on beaches, negating any access impacts due to timber harvest or road building.

## Subsistence Fish and Shellfish Effects and Evaluation

Fish and shellfish comprise a very significant portion of the diet of most residents in Southeast Alaska. Over 60 percent of the subsistence resources gathered by Petersburg residents are fish and shellfish; the comparable figure for Wrangell is almost 70 percent.

Subsistence fish and marine invertebrate use areas were derived largely from the TRUCS maps. The only reported subsistence marine invertebrate harvest areas within the project area were by residents of Petersburg. Subsistence use areas include the tidal areas from Icy Cove north to the Point Agassiz Peninsula and along the north shoreline of the Point Agassiz Peninsula between Wood Point and the mouth of Bock Bight, plus the waters of Thomas Bay north of Ruth Island. These areas are probably mostly used to harvest shrimp and crab. A commercial dungeness crab fishery also occurs in the waters near the mouth of the Patterson River, and it is likely that some subsistence crab harvest occurs here as well.

Petersburg residents report using the marine waters of Frederick Sound and Thomas Bay extensively for subsistence salmon and other fish harvesting. Wrangell residents report extensive use of the project area for harvesting salmon and other fish. Areas reportedly used by Wrangell residents include Thomas Bay, Frederick Sound offshore of the Muddy River and Brown Cove, the Patterson River drainage, the lower two miles of the Muddy River, Ruth Island, Bock Bight Peninsula, and various inland locations near Point Agassiz, Brown Cove, and the Thomas Bay log dump. Edna Bay residents have also reported using the waters of Frederick Sound offshore of the Point Agassiz Peninsula for salmon and other fish harvesting.

## Subsistence Timber and Firewood Effects and Evaluation

Each Alaska resident is entitled to 10,000 board feet of sawtimber and 25 cords of firewood every year for personal use. Current subsistence wood use in the project area is estimated at 10-15,000 board feet of sawtimber and 30 cords of firewood a year for the project area by all users. Harvesting timber would have both a negative and positive effect on subsistence wood use. One positive effect would be the increased access to forested areas with the construction of new roads. Firewood may also be made available at the landings. However, this increased access would be only temporary since almost all new specified roads and all new temporary roads are proposed for closure after timber harvest is complete.

Some accessible timber is within the Point Agassiz Old-Growth reserve. Subsistence timber harvest is allowed within locally determined areas within Old-growth Habitat reserves, if determined to be consistent with old-growth habitat objectives (Forest Plan, 3-80). There is a preference for large spruce trees in subsistence harvest. Excessive harvest

## Other Environmental Considerations

of these trees may not be compatible with Old-growth Habitat reserve objectives. Because of expanded old-growth reserves in Point Agassiz area, Alternatives 3 and 6 could result in more restriction to subsistence timber harvest than the other alternatives.

Modifications were made in Alternative 6 to provide more opportunity for subsistence wood gathering while still emphasizing protection of high volume old-growth in the Point Agassiz area. One modification was to keep a 100-foot wide strip of forest along both sides of a portion of Road 6252 out of the reserve. Another modification was to manage a portion of the high-volume forest with single-tree selection harvest and a 200-year rotation. This modification would permit subsistence timber harvesting while maintaining old-growth habitat features.

### Food Plants Effects and Evaluation

Other items used for subsistence include plants such as kelp, seaweed, and a variety of berries. TRUCS data indicate that other foods and plants make up 3.6 percent of the per capita harvest of the household subsistence harvests in Petersburg. Roads and clearcuts within the project area are used to harvest some plants such as berries. Most traditional gathering of other plants and foods occurs near beach and estuarine areas. Clearcutting with reserves would probably improve the abundance of berries in the short term, because many of these plant species thrive on the open exposed slopes (Alaback 1982). Based on a projected increase of berries and the locations of the potential activities, none of the alternatives is expected to negatively affect subsistence plant gathering for food. Reasonably foreseeable effects of the action alternatives on the abundance and distribution of food plants would be minimal and favorable.

### Marine Mammals Effects and Evaluation

The Marine Mammal Protection Act of 1972 prohibits the taking of marine mammals by anyone other than Alaska Natives. The Act allows Alaska Natives to take marine mammals for subsistence or to create authentic native handicrafts or clothing as long as it is not accomplished in a wasteful manner.

The TRUCS data indicates that some harvest of marine mammals by Wrangell residents has been reported to occur near the McDonald Islands, but none has been reported within Thomas Bay. The McDonald Islands will not be affected by any of the alternatives. Currently, there is no evidence to suggest that timber harvest and related development activities have any impact on marine mammals. No significant restriction to the subsistence use of marine mammals is expected under any alternative.

### Cumulative Effects

The subsistence analysis evaluates whether the project, in combination with other past, present, and reasonably foreseeable future actions, may significantly restrict subsistence uses. Although the precise location of future projects is not clearly known, some conclusions can be reasonably made about future impacts.

Action on other than Federal lands in the project area may affect subsistence resources harvested by local residents. Most of the State land has been logged or otherwise developed and the harvest impacts on state lands have been accounted for in the wildlife models displayed earlier in this Biodiversity Issue section. Some activities, such as opening roads and tree thinning are currently planned on State land at Thomas Bay by the Alaska Department of Fish and Game in order to maintain forage production and benefit moose and deer hunters. The cumulative effects of past activities on non-National Forest lands are not expected to significantly exceed impacts to subsistence use of wildlife beyond that shown in this analysis.

## Other Environmental Considerations

The Forest Plan addressed the long-term consequences on subsistence and concluded that a significant restriction on subsistence use of deer and other land mammals may result due to the potential effects of project-level decisions. The Crystal Creek project analysis in combination with past timber harvest indicates that significant restrictions on subsistence use are not likely as a result of any of the action alternatives.

Several measures are designed to maintain subsistence wildlife species over time. Some measures set aside habitat in 1000-foot beach and estuary buffers, Old Growth Habitat reserves, and permanently sustain equal mixtures of older-forest habitat and young growth vegetation. Other measures include limiting harvest above 1500 feet elevation in goat habitat, scheduling harvest throughout the rotation, closing roads, using single-tree selection harvest, leaving reserve trees within clearcuts, and thinning second growth to prolong understory vegetation. Application of Forest Plan riparian standards and guidelines will minimize future impacts to fish habitat.

The Federal Subsistence Board has the authority to regulate subsistence and non-subsistence use of resources in the Tongass National Forest when those resources are approaching scarcity. This type of action, as prescribed by ANILCA Section 804, could be used to ensure the availability of adequate subsistence resources needed by the rural communities using the project area if necessary.

### **ANILCA Compliance**

The actions proposed in this document have been examined to determine whether they are in compliance with the Alaska National Interest Lands Conservation Act (ANILCA) Section 810. Standards used for the review include (1) the National Forest Management Act of 1976 and its implementing regulations; (2) the Alaska National Interest Lands Conservation Act (1980); (3) the Alaska Regional Guide (1983); (4) the Tongass Land and Resource Management Plan; (5) the Tongass Timber Reform Act (1990); (6) the Alaska State Forest Practices Act; (7) the Alaska Coastal Management Program; (8) Multiple Use Sustained Yield Act (1960); (9) USDA Forest Service Subsistence Management and Use Handbook (FSH 2609.25).

### **Necessary and Consistent with Sound Management of Public Lands**

ANILCA placed an emphasis on the maintenance of subsistence resources and lifestyles. However, the Act also required the Forest Service to make timber available for harvest from the Tongass National Forest. The Forest Plan makes the determination of which uses are suitable for various parcels of land within the Tongass National Forest. The Forest Plan has determined that parts of the project area should be managed for varying levels of timber production.

The alternatives presented here encompass four action alternatives that would help achieve multiple-use management objectives in the Forest Plan. None of the action alternatives have a significant possibility of a significant restriction to subsistence uses. Based entirely on the guidance provided by the documents listed above, these action alternatives are considered necessary and consistent with sound management of public lands.

### **Amount of Land Necessary to Accomplish the Purpose of the Proposed Action**

Much of the Tongass National Forest is used by one or more rural communities for subsistence purposes. It is not possible to lessen timber harvest in one area, and concentrate it in another without impacting one or more rural communities' important subsistence use areas.



## Other Environmental Considerations

The Crystal Creek Project Area is about 64,200 acres, not including saltwater. The acreage for proposed harvest units range from about 1,015 in Alternative 2 to 1,286 acres in Alternative 3. Although Alternative 3 has the most harvest acres, it avoids harvesting the higher volume stands which generally are more valuable wildlife habitat. In many of the harvest units in all action alternatives, only about 10 to 40 percent of the entire unit will be logged.

The extent and location of the subsistence use areas in the Crystal Creek Project Area make it impossible to completely avoid these areas during timber harvest. However, large areas of critical deer habitat and important hunting areas, such as Ruth Island, Bock Bight, Point Agassiz Peninsula and the area facing Frederick Sound from the Muddy River to Horn Cliffs were mostly avoided in all alternatives. Nearly all the highest quality goat winter habitat was also avoided in all of the action alternatives. Existing roads and logged areas are heavily used for subsistence hunting. Road access restrictions are proposed to keep future motorized access by hunters comparable to the current situation.

### **Reasonable Steps to Minimize Adverse Impacts Upon Subsistence Uses and Resources**

Chapter 2 and Appendix A describe mitigation measures that will be implemented as part of each alternative. Most of the mitigation measures are designed to maintain fish and wildlife habitat productivity, while still harvesting timber to meet the purpose and need of this project.

One of the most significant subsistence resources in the analysis area is salmon. Fish habitat is protected in each alternative through the application of the Forest Plan standards and guidelines. In addition to protecting fish habitat, estuarine and riparian buffers also protect habitat important to other species such as deer, black bear, and furbearers.

Alternative 3, which proposes to double the size of the small Old-growth Habitat reserve at Point Agassiz, provides greater long-term habitat protection to a deer and furbearer subsistence use area. Alternative 6 also provides a high degree of habitat protection to this area by increasing the size of the small Old-growth Habitat reserve at Point Agassiz and by limiting harvest in high volume stands to single-tree selection. Alternative 5 would not build roads in Crystal Creek drainage and therefore would not increase foot access to the Horn Cliffs goat population. Road closures in the Crystal Creek drainage are designed to minimize impacts to subsistence species in Alternatives 2, 3, and 6. Alternative 6 proposes building one mile less of road in the Crystal Creek drainage than Alternatives 2 and 3.

About 1,600 acres of second growth thinning are proposed in all alternatives. These treatments are expected to increase moose habitat potential by about 7 percent and deer habitat potential by about 1.4 percent within the project area for the next 20 years (Tables 3-8 and 3-22). This increase in habitat potential should directly benefit subsistence hunting opportunities.

## Other Environmental Considerations

### Conclusions and Findings

The potential foreseeable effects from the action alternatives in this project are not expected to result in a significant restriction of subsistence uses of deer, black bear, moose, furbearers, marine mammals, waterfowl, salmon, other finfish, shellfish, or other foods.

No increased impacts on subsistence goat hunting are likely to occur, in any action alternative. Alternative 5 would not substantially change access to Crystal Creek from the present condition. Alternatives 2, 3, and 6 would change access but the possibility of over harvest to the Horn Cliffs goat population is minimized by the proposed road closure to public access at the Muddy River crossing. Goat harvest in the Horn Cliffs area will be monitored to see if further road management restrictions are warranted.

The findings conclude that no alternative will negatively affect subsistence harvest of goats within the project area or in the adjoining Horn Cliffs area. A significant possibility of a significant restriction to subsistence use is not expected for any of the proposed alternatives.

## Threatened, Endangered, and Sensitive Species

### Endangered and Threatened Wildlife

Federally-listed Threatened and Endangered species are those plant and animal species formally listed by the U.S. Fish and Wildlife Service or the National Marine Fisheries Service, under authority of the Endangered Species Act of 1973, as amended.

Endangered species known to occur within or adjacent to the project area include the humpback whale and the American peregrine falcon. Humpback whales are commonly found in Frederick Sound and may occasionally visit Thomas Bay. The American peregrine falcon may occur within the area as a transient migrant.

The only threatened species, the Steller's sea lion, may be found in Thomas Bay and Frederick Sound. A sea lion haulout occurs on the shoreline rocks at the north end of Horn Cliffs within the Stikine-LeConte Wilderness Area. There are no sea lion rookeries in Frederick Sound or Thomas Bay near the Crystal Creek Project area.

None of the alternatives are expected to have any significant negative effects on humpback whales, Steller's sea lions, or American peregrine falcon because of their limited occurrence and the lack of any identified critical habitat for these species within or adjacent to specific areas of proposed activities.

In response to comments by the National Marine Fisheries Service to the Biological Assessment for humpback whales and Steller's sea lions, the Forest Service will require that all field-going Forest Service personnel and contracted workers who are involved with the project and access the area by boat be familiar with the 1997 Alaska Marine Mammal Viewing Guidelines or latest available guidelines. A copy of the guidelines will be posted in the field camp at Thomas Bay. Familiarization with the Marine Mammal Viewing Guidelines has been incorporated into the 1998 field training program for Forest Service personnel on the Petersburg Ranger District.

### Sensitive Wildlife

Sensitive species are those species identified by the Regional Forester for which population viability is a concern in the Alaska Region. Currently, there are four Sensitive animal species that are known or likely to occur in the Crystal Creek Project Area (Table 3-40). The Forest Service has a Memorandum of Understanding with the U.S. Fish and Wildlife Service, other federal agencies, and the Alaska Department of Fish and Game, to cooperate in the conservation of species tending toward federal listing so that listing is unnecessary.

**Table 3- 40. Alaska Region Sensitive Animal Species that Are Known or Likely to Occur within the Crystal Creek Project Area**

| Common Name              | Scientific Name                       |
|--------------------------|---------------------------------------|
| Queen Charlotte goshawk  | <i>Accipiter gentilis laingi</i>      |
| Trumpeter swan           | <i>Cygnus buccinator</i>              |
| Osprey                   | <i>Pandion haliaetus carolinensis</i> |
| Peale's peregrine falcon | <i>Falco peregrinus peali</i>         |



## Other Environmental Considerations

**Queen Charlotte goshawk:** This subspecies of goshawk is a resident raptor in Southeast Alaska that prefers productive old-growth forest for nesting and foraging. Goshawk surveys were done in the project area during field reconnaissance of the proposed units. Several goshawks were sighted during the summers of 1996 and 1997 in the Patterson and Muddy River drainage basins. Nesting may occur within the project area.

Impacts to goshawk habitat are estimated by changes in the amount of productive old growth forest. The placement of reserve blocks of old growth throughout the project area, together with riparian and beach fringe buffers and other remaining old growth forests that will not be harvested, should assure that a viable populations of goshawks are maintained. In addition, the presence of the Stikine-LeConte Wilderness and the Spires Roadless Area adjacent to the project area provides undisturbed habitat for this species, further enhancing viability.

Currently there are about 24,600 acres of productive old growth forest on National Forest lands within the project area, which represents about 82 percent of the original forest prior to large-scale logging. The percent of remaining old growth harvested using clearcut with reserve or group selection harvest methods is 0 percent in Alternative 1; 2.4 percent in Alternative 2; 2.3 percent in Alternative 3; 1.3 percent in Alternative 5; and 2.1 percent in Alternative 6. Group selection harvest will retain old growth forest in close proximity to small logged openings.

Goshawks use a wide variety of productive forests for nesting and foraging habitat. Single-tree selection harvest that removes 40 percent or less of the basal area should maintain usable goshawk habitat throughout the stand.

All harvest units in the selected alternative will be surveyed for goshawk nests during timber harvest layout. Proposed thinning/pruning units will be reviewed by the wildlife biologist prior to implementation. Nest searches will be conducted in all proposed second growth treatment units and adjacent areas if the biologist thinks there is a reasonable likelihood of goshawk nests being present. If goshawk nests are located, they will be protected by 100-acre nesting habitat buffers and timing clauses, according to Forest Plan Standard and Guidelines (page 4-90 and 91).

**Trumpeter Swan:** Trumpeter swans are common within the project area during spring and fall migration and during mild winter months when lakes and ponds are ice-free. There is no known swan nesting in the Stikine Area. Swans are not known to winter within the project area during periods of severe cold.

Beach, estuarine, and riparian buffers will minimize potential disturbances to migratory habitat in all alternatives. Swans have been observed during spring, fall, and mild winters in one large muskeg pond along the proposed road relocation of Road 6256. About 300 feet of this road will be immediately adjacent to the wetland area and will not be screened by existing vegetation. Road traffic may cause some disruption to swan use of the pond area. Alder or other tree species will be planted along the roadside to screen the roadway from the pond area. A timing clause will prohibit construction within 0.5 mile of the wetland area during the period October 15 to April 15 when wintering or migratory swans may be present to prevent disruption due to road construction.

## Other Environmental Considerations

**Osprey:** The project area is one of the few areas in Southeast Alaska that has a known nesting population of osprey. Since 1976, seven nest trees have been located. The nest sites were located in or adjacent to openings providing the birds an unobstructed view of the surrounding area. Five of these occurred in snags in clearcuts on State land. Four of these nest trees have since fallen down or deteriorated. The remaining nest on State land and the nest on national forest land were active most years between 1990 and 1997. A new active nest was located in 1996 on national forest land in a large spruce.

One active osprey nest occurs adjacent to two proposed units in Alternative 5. This nest is adjacent to one second-growth unit that has been proposed for thinning in all alternatives. Timing clauses will be placed on activities in these units from April 15 to August 31, to prevent disturbances to the nesting site if occupied. Searches for osprey nests will be conducted within and adjacent to all proposed harvest units. Proposed thinning/pruning units will be reviewed by the wildlife biologist prior to implementation. Nest searches will be conducted in all proposed second growth treatment units and adjacent areas if the biologist thinks there is a reasonable likelihood of osprey nests being present. Buffers and timing clauses will be used to protect any osprey nests. Proposed timber harvest within these areas will retain some existing snags and reserve trees that would be suitable for osprey nest construction (Appendix A).

**Peale's peregrine falcon:** In Southeast Alaska, the nests of this falcon subspecies have been located primarily along cliffs facing the open ocean and near large seabird colonies. No nests have been reported along the inside waters adjacent to or within the project area. This falcon probably migrates through the project area. Beach and estuarine buffers should minimize disturbances to habitats that are used most frequently during migration. No impacts to this subspecies are expected in any of the alternatives.

### Sensitive Plants

Fifteen plant species designated as Sensitive in the Alaska Region, are known or suspected to occur in the Petersburg Ranger District (Table 3-41).

Botanical surveys were conducted in various habitats within the project area. No sensitive plants were found during these surveys (Dillman and Pawuk 1996). The known sensitive plant species on the Petersburg Ranger District are Wright filmy fern, Choris bog orchid, Davy Mannagrass, and loose-flowered bluegrass. The only sensitive plant located on the mainland was loose-flowered bluegrass in an estuarine meadow in Sandborn Canal. If sensitive plants are found within or adjacent to areas where activities are proposed, appropriate mitigation measures will be taken.

## Other Environmental Considerations

**Table 3- 41. Current Alaska Region Sensitive Plant Species That Are Known or Likely to Occur on the Petersburg Ranger District**

| Common Name                | Scientific Name  |
|----------------------------|--|
| Goose-grass sedge          | <i>Carex lenticularis</i> var. <i>dolia</i>            |
| Edible thistle             | <i>Cirsium edule</i>                                   |
| Northern rockcress         | <i>Draba borealis</i> var. <i>maxima</i>               |
| Davy mannagrass            | <i>Glyceria leptostachya</i>                           |
| Wright filmy fern          | <i>Hymenophyllum wrightii</i>                          |
| Truncate quillwort         | <i>Isoetes truncata</i>                                |
| Calder lovage              | <i>Ligusticum calderi</i>                              |
| Choris bog orchid          | <i>Platanthera gracilis</i>                            |
| Bog orchid                 | <i>Platanthera gracilis</i>                            |
| Loose-flowered bluegrass   | <i>Poa laxiflora</i>                                   |
| Kamchatka alkali grass     | <i>Puccinellia kamtschatica</i>                        |
| Straight-beak buttercup    | <i>Ranunculus orthorhynchus</i> var. <i>alascensis</i> |
| Unalaska mist-maid         | <i>Romanzoffia unalascensis</i>                        |
| Queen Charlotte butterweed | <i>Senecio moresbiensis</i>                            |
| Circumpolar starwort       | <i>Stellaria ruscifolia</i> spp. <i>aleutica</i>       |

### Other Wildlife

The marbled murrelet, harlequin duck, and the spotted frog were species that we received comments about that are neither Forest Service sensitive species nor management indicator species. Habitat concerns of these species are discussed in this section.

**Marbled murrelet:** This robin-sized seabird species prefers old-growth trees with lichens for nesting. It has recently been listed as Threatened in Washington, Oregon, and California, due in part to extensive loss of old-growth forests. Limited surveys in 1996 and 1997 indicate that murrelets nest within the project area. The actual detection of nests is very difficult, and no nest sites have been located to date.

Impacts to marbled murrelet nesting habitat are best estimated by the change in the acres of productive old growth in each alternative. This parallels the analysis presented for goshawks in the previous section. Possible murrelet nesting habitat will be reduced by 1.3 to 2.3 percent in the action alternatives. If murrelet nests are found, they will be protected with 600-foot buffers and timing clauses, in accordance with the Forest Plan Standards and Guidelines (Forest Plan).

**Harlequin Duck:** The U. S. Fish and Wildlife Service requested that the effects of the proposed timber harvest on harlequin ducks be evaluated. The harlequin duck is a common year-round bird in Southeast Alaska (Gabrielson and Lincoln 1959). They spend most of the year in saltwater within the intertidal and subtidal areas, but generally nest near swift-flowing freshwater streams. Few nests have been located in Southeast Alaska. No nesting pairs have been documented within the project area.

The 1000-foot beach and estuarine buffers will protect important wintering, migration, and summer foraging habitat of waterfowl in all alternatives. Riparian buffers will protect the most likely harlequin duck nesting habitat in all alternatives.

**Spotted frog:** Spotted frogs are generally found in or adjacent to permanent freshwater bodies, usually in association with grasses, sedges, and rushes. Spotted frogs have been



## Other Environmental Considerations

found in sphagnum-dominated muskegs on the Point Agassiz Peninsula and in a muskeg pond near proposed Road 44900.

The approximate acres of wetland vegetation where frogs might possibly be found that may be affected by proposed roads are:

- ♦ Alternative 1 - 0 acres,
- ♦ Alternative 2 - 39 acres,
- ♦ Alternative 3 - 25 acres,
- ♦ Alternative 5 - 7 acres, and
- ♦ Alternative 6 - 35 acres.

If spotted frogs are found in proposed road right-of-ways, road locations will be altered, if feasible. If spotted frog habitat is found within proposed harvest units, buffers will be established around the habitat. No negative impacts to spotted frogs are expected in any of the alternatives.

### Wetlands

Approximately 38 percent of the Crystal Creek Project Area is classified as wetlands by the Stikine Area Soil Resource Inventory, which shows areas of hydric soils and wetland plants (Table 3-42). Wetlands moderate flooding, reduce runoff and sedimentation, provide wildlife and plant habitat, and may help sustain stream flow during dry periods.

In general, site productivity is inversely related to the duration a particular wetland site is saturated. Wetland sites that are saturated only brief periods of time may have commercial timber which is included in the suitable timber base. Sites with longer periods of soil saturation generally have lower productivity.

**Table 3- 42. Wetland Habitats, Dominant Vegetation, and Acreage for the Project Area**

| Wetland Habitat Type              | Typical Species   | Wetland Acres | % of Area |
|-----------------------------------|---|---------------|-----------|
| Subalpine/Forest/Muskeg Mosaic    | mountain hemlock, deer cabbage, sedges, low growing blueberry, and heaths                                   | 3,864         | 6         |
| Alpine Wetlands                   | heaths, crowberry, mountain heather, blueberry, caltha-leaved avens   | 5,418         | 8         |
| Estuaries                         | seaside plantain, sea mildwort, sedges  | 1,290         | 2         |
| Forested Wetland                  | western hemlock, Alaska yellow-cedar, Sitka spruce, mountain hemlock, skunk cabbage, deer cabbage           | 3,374         | 5         |
| Muskeg (Bog)                      | sphagnum moss, marsh marigold, crowberry, Labrador tea, shore pine  | 2,960         | 5         |
| Muskeg/Forested Wetland Mosaic    | western hemlock, Sitka spruce, mountain hemlock, yellow cedar, shore pine, sphagnum moss, sedges, crowberry | 7,168         | 11        |
| Emergent Sedge Muskeg (Sedge Fen) | sedges  | 716           | 1         |
| <b>Total</b>                      |   | <b>24,790</b> | <b>38</b> |

## Other Environmental Considerations

Some disturbance of forested wetlands is expected to result from timber harvest (Table 3-43). These impacts are generally short-term due to the regeneration of vegetation. Some longer term impacts will result from new road construction in wetlands (Table 3-44). Permanent loss of wetland vegetation will occur where fill is placed in wetlands to form the road foundations. The types of potential impacts to wetlands from implementation of the action alternatives include: 1) loss of wetland vegetation, 2) erosion and increased sedimentation loading, and 3) some artificial concentration of runoff water.

**Table 3- 43. Acres of Wetland Within Proposed Harvest Units\***

| Silvicultural Prescription          | Alt. 1<br>Acres | Alt. 2<br>Acres | Alt. 3<br>Acres | Alt. 5<br>Acres | Alt. 6<br>Acres |
|-------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Clearcut with Reserves              | 0               | 196             | 32              | 35              | 164             |
| Group Selection 40%                 | 0               | 0               | 0               | 26              | 0               |
| Group Selection 30%                 | 0               | 39              | 53              | 0               | 39              |
| Group Selection 10%                 | 0               | 0               | 0               | 0               | 0               |
| Single Tree Selection 20%           | 0               | 0               | 0               | 7               | 10              |
| Single Tree Selection (0-60%)       | 0               | 0               | 0               | 0               | 0               |
| <b>Total Harvested Volume/Acres</b> | <b>0</b>        | <b>235</b>      | <b>85</b>       | <b>68</b>       | <b>296</b>      |

\* Acres shown in the table are within the entire unit and may not be harvested.

Wetland acres will be avoided where possible.

**Table 3- 44. Miles of Existing and Proposed Roads on Wetlands**

|                                   | -- Proposed Roads on Wetlands -- |                 |                 |                 |                 |
|-----------------------------------|----------------------------------|-----------------|-----------------|-----------------|-----------------|
|                                   | Alt. 1<br>Miles                  | Alt. 2<br>Miles | Alt. 3<br>Miles | Alt. 5<br>Miles | Alt. 6<br>Miles |
| Muskeg                            | 0                                | 0               | 0.1             | 0               | 0               |
| Sedge Fen                         | 0                                | 0.3             | 0.3             | 0.3             | 0.3             |
| Forested Wetland                  | 0                                | 4.0             | 2.3             | 0.2             | 3.3             |
| Estuarine Wetland                 | 0                                | 0               | 0               | 0               | 0               |
| Subalpine Forested Wetland Mosaic | 0                                | 0               | 0               | 0               | 0               |
| Muskeg Forested Wetland Mosaic    | 0                                | 2.2             | 1.4             | 0.7             | 2.2             |
| Forested Upland Wetland Mosaic    | 0                                | 0               | 0               | 0               | 0               |
| <b>Total</b>                      | <b>0</b>                         | <b>6.5</b>      | <b>4.1</b>      | <b>1.2</b>      | <b>5.8</b>      |

## Other Environmental Considerations

**Erosion and Increased Sedimentation:** Erosion may occur as a result of road construction, heavy equipment use, and log yarding. The risk of sedimentation as a result of harvest activities is generally low because of deep organic covering over mineral soils. Logging slash covering the soil surface will add to this protection. Rapid regrowth of vegetation will insure minimal impact.

**Floodflow Increase:** Changes in stream flows are expected to be minimal. A slight change in peak flows and surface flows may result from filling wetlands for road construction. This may result in some localized erosion, channel adjustment, and sedimentation.

**Loss of Wetland Wildlife Habitat:** Loss of most wildlife habitat in wetlands is expected to be temporary due to vegetation regeneration. Disruption of wildlife migration corridors may occur. Alternatives 2, 3, 5, and 6 propose road construction in one acre of sedge fen which result in long term loss.

**Mitigation** Road routes avoided wetlands wherever feasible. To avoid artificial interception of water by roads, free draining coarse textured rock will be used in road foundations, uphill ditches will be limited, and installation of adequate size and numbers of culverts will be required. Drainage structures will be removed on all temporary roads.

**Wetland Enhancement:** A project is proposed on a low gradient tributary channel located northeast of the Muddy River. An elevated culvert will be used to raise the water level in a wetland along Road 6256 (Appendix A).

**Wetland Protection:** A large wetland along the relocated portion of Road 6256 will be protected by establishment of a log and rootwad revetment bank protection structure. The structure will be placed along a 600 foot portion of the Muddy River where a meander threatens to erode into the wetland. This measure will help protect swan habitat (Appendix A).



## Specifically Required Disclosures

### National Forest Management Act

#### Tongass Land and Resource Management Plan and Alaska Regional Guide

This decision is consistent with the Alaska Regional Guide and the Tongass Land Management Plan.

#### Transition to the Forest Plan

The Forest Plan, through the Record of Decision (page 41), places certain requirements on timber sale projects for which environmental analysis had begun, but no NEPA decision made, at the time of the effective date for implementation of the Forest Plan (July 31, 1997). There are two requirements:

- 1) projects must be consistent with all applicable management direction of the proposed plan, and
- 2) where needed, additional measures for landscape connectivity, endemic terrestrial mammals, northern goshawk, and American marten described in the Record of Decision and Final Environmental Impact Statement for the Forest Plan will be incorporated; this need will be determined through interagency review.

This project incorporates all applicable management direction from the Forest Plan and is fully consistent with its goals, objectives, Forest-wide standards and guidelines, and management area prescriptions as they apply to the project area. The required interagency review and analysis of the need for additional measures was accomplished, and these measures have been included.

For the four additional standards and guidelines described in the Record of Decision and Final Environmental Impact Statement of the Forest Plan, the following measures were incorporated.

- ◆ *Landscape connectivity* - An old-growth corridor was identified that would connect the medium Old-growth Habitat reserve north of the project area with the Stikine-LeConte Wilderness to the south of the project area.
- ◆ *Endemic terrestrial mammals* - Since the project area was not located on an island less than 50,000 acres, surveys for endemic mammals were not required. However, the University of Alaska conducted small mammal surveys during 1997 within the project area.
- ◆ *Northern goshawk* - Although the additional measures for goshawk were not required in the Crystal Creek project area, surveys were done within the project area during the 1996, 1997, and 1998 field seasons using the regional protocol. Any observation that suggested nesting activity was followed by more intensive surveys by wildlife biologists. Forest Standards and Guidelines were followed.
- ◆ *American marten* - Although road access was not determined to significantly contribute to an unsustainable marten mortality, most of the roads that will be constructed for this project will be closed after timber harvest is complete. Since the project area is not located in a higher risk biogeographic province; the standards and guidelines for forest stand structure do not apply. However, all timber harvest units in the Selected Alternative will retain at least 15 percent of the green trees within the unit. Single-tree selection, that retains 80 percent of the green trees, is prescribed for most of the highest volume strata timber stand harvest units. Large trees that can be used for marten habitat will be retained.

## **Optimal Methods of Harvesting**

### *Two-aged Stand Management*

The clearcut-with-reserves prescription will have clumps or scattered green trees remaining after harvest. This prescription will result in a more diverse post-harvest stand structure which will be more visually pleasing and provide better wildlife habitat than traditional clearcuts. At the time of harvest, these clumps/trees will be selected for windfirmness, the relative absence of disease and dwarf mistletoe, wildlife attributes, and noncommercial value.

### *Uneven-aged Stand Management*

For harvest units with stand objectives of uneven-aged management, the silvicultural prescriptions are either group selection or single tree selection. A more detailed discussion of each of these units can be found in Appendix A.

**Harvest Openings Over 100 Acres in Size** - There are no harvest openings over 100 acres proposed for this project.

## **Endangered Species Act**

None of the action alternatives is anticipated to have a direct, indirect, or cumulative effect on any threatened or endangered species in the Crystal Creek project area or elsewhere. The U.S. Fish and Wildlife Service and the National Marine Fisheries Service have concurred that the actions described within the proposed project are not likely to adversely affect threatened and endangered species. A complete biological assessment is included in the planning record for this project.

## **Bald Eagle Protection Act**

Management activities within 330 feet of an eagle nest site are restricted by a Memorandum of Understanding (MOU) between the Forest Service and the U.S. Fish and Wildlife Service to comply with the Bald Eagle Protection Act. None of the action alternatives is anticipated to have a significant direct, indirect, or cumulative effect on any bald eagle habitat. If any nests are found that may be affected, the MOU and Forest Plan Standards and Guidelines will be followed.

## **Tongass Timber Reform Act**

Harvest units were designed and located to maintain a minimum 100-foot buffer zone for all Class I streams and Class II streams that flow directly into Class I streams as required in Section 103 of the TTRA. As discussed in Appendix A, the actual widths of these buffer strips will often be greater than the 100-foot minimum. The design and implementation direction incorporates Best Management Practices (BMPs) for the protection of all stream classes.

## National Historic Preservation Act

Cultural resource surveys of various intensities have been conducted in the project area. These surveys included background and existing literature searches and fieldwork complete with subsurface testing. Public comment was encouraged at open houses held in Petersburg and Kake. A questionnaire available at the meetings elicited information about known or suspected cultural resources in or near the project area. The State Historic Preservation Officer has been consulted including complying with the provisions of 36 CFR part 800. There will be no significant effects on known cultural resources in any of the action alternatives.

## Federal Cave Resource Protection Act of 1988

The action alternatives will not have a direct, indirect, or cumulative effect on any significant cave in the Crystal Creek project area. No cave resources have been documented in the project area, and no caves were discovered during field work done for this analysis.

## ANILCA Section 810, Evaluation and Findings

A subsistence evaluation was conducted for the five alternatives considered in detail, in accordance with ANILCA Section 810. The evaluations in the Subsistence Report on abundance and/or distribution, access and competition for harvested resources in the project area indicate that there will not be a significant restriction on subsistence uses of wildlife, fish, and shellfish, marine mammals, other foods, and timber resources as a result of this project. There is not a significant possibility of a significant restriction to subsistence as a result of this project.

## Clean Water Act

The design of harvest units and roads for the Selected Alternative was guided by standards, guidelines and direction contained in the Tongass Land and Resource Management Plan, Alaska Regional Guide, and applicable Forest Service manuals and handbooks. Appendix A contains specific details on practices prescribed to prevent or reduce non-point sediment sources. Reasonable implementation with site-specific application and monitoring of approved BMPs is expected to comply with applicable State Water Quality Standards Regulations.

These regulations provide for variances from anti-degradation requirements and water quality criteria. The harvest and road building operators will be responsible for compliance, including obtaining any variance required by the State. Compliance will be monitored by Forest Service personnel. The Forest Service expects the Crystal Creek Timber Harvest activities to fully qualify for any variance required by the State, according to the criteria in 18 AAC 70.015.

All roads, landings, and rock pits for this project will be designed to minimum standards to accommodate timber harvesting and silvicultural activities and will be constructed in accordance with Best Management Practices listed at 33 CFR 323.4(a). Therefore, no permits under Section 404 of the Clean Water Act are required.



## **Clean Air Act**

Emissions expected from implementing any of the action alternatives would be of short duration and are not expected to exceed State Ambient Air Quality Standards (Alaska Administrative Code, Title 18, Chapter 50).

## **Coastal Zone Management Act**

The Coastal Zone Management Act of 1972 (CZMA), while specifically excluding Federal lands from the coastal zone, requires that a Federal agency's activities be consistent with the enforceable standards of a state's coastal management program to the maximum extent practicable when the agency's activities affect the coastal zone.

The enforceable standards for timber harvest activities are found in the State Forest Practices Act. The standards and guidelines for timber management activities in the Crystal Creek project area meet or exceed the standards in the State Forest Practices Act.

The Alaska Division of Governmental Coordination did a preliminary consistency review of our determination for the Draft EIS. The State concurred with the Forest Service determination of consistency, providing that the alternative measure of including temporary bridges at designated crossings is implemented. The recommendations from this review have been included in the Selected Alternative. The proposed activities are consistent with the Alaska Coastal Management Program to the maximum extent practicable.

## **Effects on Prime Farm Land, Range Land, and Forest Land**

No prime farm land or range land will be adversely impacted by the action alternatives. Forest land will maintain its productivity.

## **Effects on Civil Rights, Women, and Minorities**

There will be no adverse impacts on civil rights, women, and/or minorities.

## **Executive Order 11988**

Executive Order 11988 directs Federal agencies to take action to avoid, to the extent possible, the long and short-term adverse impacts associated with the occupancy and modification of floodplains. The numerous streams in the Crystal Creek project area make it impossible to avoid all floodplains during timber harvest and road construction. The design of the proposed developments and the application of Best Management Practices combine to minimize adverse impacts on the floodplains. A 2.2 mile portion of Forest Road 6256 will be relocated out of the active floodplain along the Muddy River.

### **Executive Order 11990**

Executive Order 11990 requires Federal agencies to avoid, to the extent possible, the long and short-term adverse impacts associated with the destruction or modification of wetlands. Soil moisture regimes and vegetation on some wetlands may be altered in some harvest units; however, the affected wetlands will meet wetland classification and will still function as wetlands in the ecosystem.

Because wetlands are so extensive in the project area, it is not feasible to avoid all wetland areas. However, wetlands are avoided whenever practicable. Road construction results in the filling of wetlands and creates a permanent loss of wetland habitat. Effects will be minimized by not using wetlands as sites for overburden disposal and avoiding road construction through wetlands whenever practicable. Implementation of BMPs, minimizing ditching, and providing adequate cross drainage will also help minimize the area affected.

### **Executive Order 12898**

Executive Order 12898 directs Federal agencies to identify and address the issue of environmental justice, i.e. adverse human health and environmental effects of agency programs that disproportionately impact minority and low income populations. Implementation of the action alternatives will not cause adverse health or environmental effects that disproportionately impact minority and low income populations. Public scoping and the analysis in the subsistence section of the FEIS contribute to meeting this Executive Order.

### **Executive Order 12962**

Executive Order 12962 directs Federal agencies to conserve, restore and enhance aquatic systems to provide for increased recreational fishing opportunities nationwide. Section 1 of the Executive Order is most pertinent to the proposed activity. Section 1 directs Federal agencies to evaluate effects on aquatic ecosystems and recreational fisheries, develop and encourage partnerships, promote restoration, provide access, and promote awareness of opportunities for recreational fishery resources.

The effects of this project have been evaluated throughout the FEIS, including effects to freshwater and marine resources. Partnerships are continuing to be used to leverage Federal project funds to address water quality concerns in areas of the Tongass National Forest, although none have been proposed for recreational fisheries in conjunction with this project.

Under the action alternatives, road closures would only provide access for recreational fishing opportunities to those willing to walk or use all-terrain vehicles, where permitted, into the project area. The proposed shelter and access trail would enhance the recreational fishing at Ess Lake. Since most recreational fishing is expected to remain in saltwater, the impact of improved access on recreational fishing opportunities is expected to be minor.

# **Chapter 4**

## **References and Lists**



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| Alaska State Library<br>Attn.: Government Publications               | Kim Hastings  |
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## References

|   |   |
|---|---|
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| Andy Wright   | Kake Tribal Logging Corp.<br>Attn.: Butch Pierce    |
| AT&T<br>Attn.: Contracts  | Southeast Guide Service<br>Attn.: Scott Newman      |
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| Head, Acquisitions and Serials<br>USDA National Agriculture Library | John Jensen   |
| Ingvald Ask   | David Randrup                                       |
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| Kaleidoscope Cruises<br>Attn.: Barry Bracken                        | Delores Lund  |
| Ketchikan Pulp Corporation<br>Attn.: Kent P. Nicholson              | Narrows Conservation Coalition<br>Attn.: Dave Beebe |
| Matt Rasmussen  | EPA Office Federal Activities                       |
| Merrily Jones   | Petersburg Pilot<br>Attn.: News Department          |
| National Marine Fisheries Service<br>Attn.: Steven Zimmerman        | Dan Randolph  |
| Organized Village of Kake<br>Attn.: Mike Jackson                    | Temsco<br>Attn.: Roland 'Doc' and Karen Gohmert     |
| Pacific Catalyst<br>Attn.: Thomas George                            | Sean Reilly   |
| Pat Taggart   | Dale Rose   |
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## References and Lists

|  |  |
|--|--|
| Regional Forester, Region 10                                   | Narrows Conservation Coalition   |
| Rocky Littleton  | Ronald Simpson   |
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| USDI, Office of Environmental Affairs                          | Wrangell Resource Council  |
| USDI, Office of Environmental Affairs<br>Attn.: Carol Hale     | Winifred O. Weber  |



## References

# Glossary

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| <b>Alaska National Interest Lands Conservation Act (ANILCA)</b> | The Alaska National Interest Lands Conservation Act of December 2, 1980. Public Law 96-487, 96 <sup>th</sup> Congress, 94 Stat. 2371-2551. Passed by Congress in 1980, this legislation designated 14 National Forest wilderness areas in Southeast Alaska. In section 705(a) Congress directed that at least \$40,000,000 be made available annually to the Tongass Timber Supply Fund to maintain the timber supply from the Tongass National Forest at a rate of 4.5 billion board feet per decade. Section 810 requires evaluations of subsistence impacts before changing the use of these lands. |
| <b>Allowable Sale Quantity (ASQ)</b>                            | The maximum quantity of timber that may be sold each decade from suitable lands on the Tongass National Forest as identified from the Forest Plan.   |
| <b>Anadromous Fish</b>  | Anadromous fish (such as salmon and steelhead) spend part of their lives in fresh water and part of their lives in salt water.   |
| <b>Anadromous Fisheries Habitat Assessment (AFHA)</b>           | An assessment conducted within the Tongass National Forest (1994) to study the effectiveness of current procedures for protecting anadromous fish habitat and determine the need for any additional protection.  |
| <b>Basal Area</b>   | Total cross-sectional area of a tree or a stand of trees. This is measured at diameter breast height (DBH) and can be expressed in either square feet per acre or square meters per hectare.   |
| <b>Biodiversity</b>   | The variety of life forms and processes, including the complexity of species, communities, gene pools, and ecological functions, within the area covered by a land management plan.  |
| <b>Board foot</b>   | A unit of timber measurement equaling the amount of wood contained in an unfinished board one inch thick, twelve inches long, and 12 inches wide.  |
| <b>Carrying Capacity</b>  | The estimated maximum number of animals that can be sustained over the long term within a specified area.  |
| <b>Clearcut with Reserves</b>                                   | A silvicultural method in which the majority of the trees in a harvest unit are cut in one entry, and the rest are left as residual trees, either singly or in patches. The residual trees remain unharvested to provide structural diversity and older-aged trees within the second-growth stand.   |
| <b>Distance Zone</b>  | Areas of landscapes visible from priority travel routes and use areas categorized by distance criteria. (Foreground: 0 to ¼- ½ mile, Middleground: ¼ - ½ to 3-5 miles, or Background: greater than 3-5 miles). Used as a frame of reference in which to discuss landscape characteristics and management activities.   |
| <b>Endangered Species</b>                                       | Any species of animal or plant that is in danger of extinction throughout all or a significant portion of its range. Plant or animal species are identified by the Secretary of the Interior as endangered in accordance with the 1978 Endangered Species Act.   |
| <b>Estuary</b>  | An ecological system at the mouth of a stream where fresh water and salt water mix, and where salt marshes and intertidal mudflats are present. The landward extent of an estuary is the limit of salt-intolerant vegetation, and the seaward extent is a stream's delta at mean low water.  |

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| <b>Even-aged Management</b>                             | Silvicultural methods that create stands of trees of essentially the same age. The difference in age between trees in forming the main canopy level of a stand usually does not exceed 20 percent of that age of the stand at harvest rotation age. Clearcut, shelterwood, or seed tree cutting methods produce even-aged stands.  |
| <b>Falldown</b>   | The difference between the number of acres planned for timber harvest and those actually harvested, usually a reduction in acres. Falldown results from many factors, including unmapped unsuitable timber land, newly available information, and project-level consideration of site-specific issues and non-timber resource needs.   |
| <b>Forest Plan</b>                                      | Source of management direction for an individual Forest specifying activity and output levels for a period of 10-15 years. Management direction in the plan is based on issues identified at the time of the plan's development.   |
| <b>Gap Phase Dynamics</b>                               | When the death of one or a few overstory trees acts like a small minor disturbance and permits a small, single-even-aged stand to grow from existing vegetation or seed germination.   |
| <b>Geographic Information System (GIS)</b>              | A computerized map data base that is used to store and evaluate sit-specific information.  |
| <b>Group Selection</b>                                  | A harvesting method in which trees are removed in small groups at a time, usually less than two acres.   |
| <b>Interdisciplinary Team (IDT)</b>                     | A group of individuals with different training assembled to solve a problem or perform a task. The team is assembled out of recognition that no one scientific discipline is sufficiently broad to adequately solve the problem. Through interaction, participants bring different points of view and a broader range of expertise to bear on the problem.   |
| <b>Land Use Designation (LUD)</b>                       | A defined area of land, identified by the Forest Plan, to which specific management direction is applied.  |
| <b>Log Transfer Facility (LTF)</b>                      | The site and structures which are used for moving logs and timber products from land-based transportation forms to water-based transportation forms.   |
| <b>Management Indicator Species (MIS)</b>               | Species selected in a planning process that are used to monitor the effects of planned management activities on viable populations of wildlife and fish, including those that are socially or economically important.  |
| <b>Muskeg</b>   | A bog, often dominated by sphagnum moss, frequently with deep accumulations of organic material, occurring in wet, poorly drained northern regions.  |
| <b>National Environmental Policy Act of 1969 (NEPA)</b> | An act declaring a National policy to encourage productive harmony between humans and their environment, to promote efforts which will prevent or eliminate damage to the environment and the biosphere and stimulate the health and welfare of humans, to enrich the understanding of the ecological systems and natural resources important to the Nation and to a Council on Environmental Quality. |
| <b>National Forest Management Act (NFMA)</b>            | A law passed in 1976 that amends the Forest and Rangeland Renewable Resources Planning Act, requires the preparation of Forest plans, requires the identification of management indicator species, and defines parameters for timber suitability.  |
| <b>Old growth</b>                                       | Ecosystems distinguished by old trees and related structural attributes. Old growth encompasses the later stages of stand development that typically differ from earlier stages  |

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in a variety of characteristics which may include larger tree size, higher accumulations of large dead woody material, multiple canopy layers, different species composition, and different ecosystem function. The structure and function of an old-growth ecosystem will be influenced by its stand size and landscape position and context.

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| <b>Overstory</b>                             | The portion of trees in a forest which forms the upper most layer of foliage.   |
| <b>Process Group</b>                         | A combination of similar channel types based on major differences in landform, gradient, and channel shapes.  |
| <b>Productive Old Growth</b>                 | Old-growth stands capable of producing 20 cubic feet per acre per year with 8,000 or more board feet of timber per acre.  |
| <b>Programmed Commercial Timber Harvest</b>  | Timber harvest that occurs on suitable forested lands that contributes to the Tongass National Forest Allowable Sale Quantity.  |
| <b>Recreation Opportunity Spectrum (ROS)</b> | <p>A system for planning and managing resources that categorizes recreation opportunities into seven classes. Each class is defined in terms of the degree to which it satisfies certain recreation experience needs based on the extent to which the natural environment has been modified, the type of facilities provided, the degree of outdoor skills needed to enjoy the area and the relative density of recreation use. The four classes found in the Crystal Creek Project Area are:</p> <p><i>Primitive:</i> An unmodified environment generally greater than 5,000 acres in size and located generally at least three miles from all roads and other motorized travel routes. A very low concentration of users results in a very high probability of experiencing solitude, freedom, closeness to nature, tranquillity, self-reliance, challenge, and risk. Evidence of other users is low.</p> <p><i>Semi-Primitive Non-motorized:</i> A natural or natural-appearing environment generally greater than 2,500 acres in size and generally located at least ½ mile (greater or less depending on terrain and vegetation, but no less than ¼ mile) but not further than 3 miles from all roads and other motorized travel routes. Concentration of users is low but there is often evidence of other users. There is a high probability of experiencing solitude, freedom, closeness of nature, tranquillity, self-reliance, challenge, and risk. No roads are present in the area.</p> <p><i>Semi-Primitive Motorized:</i> A natural or natural-appearing environment generally greater than 2,500 acres in size and generally located within ½ mile of primitive roads and other motorized travel routes; but not closer than ½ mile (greater or less depending on terrain and vegetation, but no less than ¼ mile) from better-than-primitive roads and other motored travel routes. Concentration of users is low but there is often evidence of other users. There is a moderate probability of experiencing solitude, closeness to nature, and tranquillity along with a high degree of self-reliance, challenge, and risk in using motorized equipment. Local roads may be present, or along saltwater shorelines there may be extensive boat traffic.</p> <p><i>Roaded Modified:</i> Vegetative and landform alterations typically dominate the landscape. There is little on-site control of users except for gated roads. There is moderate evidence of other users on roads (generally less than 20 group encounters per day), and little evidence of others or interactions at campsites. There is opportunity to get away from others but with easy access. Some self-reliance is required in building campsites and use of motorized equipment. A feeling of independence and freedom exists with little challenge and risk. Recreation users will likely encounter timber management activities.</p> |



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| <b>River Terrace</b>              | One of a series of level surfaces in a stream valley, flanking and more or less parallel to the stream channel. It is above the level of the stream, and represents the dissected remnants of an abandoned floodplain, stream bed, or valley floor produced during a former stage of erosion and deposition.   |
| <b>Roads</b>                      | <p><i>Permanent Roads:</i> Those Forest Development roads planned for recurrent land management uses and for which the timber sale contract specifies the location, standards, and specifications.</p> <p><i>Temporary Roads:</i> Low-level roads constructed for a single purpose and short-term use. Once use of the road has been completed, it is obliterated, and the land it occupied is returned to production.</p> |
| <b>Sawtimber</b>                  | Trees that are suitable in size and quality for the production of dimensional lumber.  |
| <b>Scoping</b>                    | Public process for determination of the significant issues to be addressed for an environmental analysis.  |
| <b>Second Growth</b>              | Forest growth that has come up naturally or has been planted after disturbance (for example, harvest, serious fire, or insect attack).   |
| <b>Seen Landscape</b>             | Those areas visible from the most frequently used travelways (boat route, recreation road, or trail) or use area (recreation cabin or anchorage).  |
| <b>Seldom-seen Landscape</b>      | Those areas not visible from the most frequently used travelways (boat route, recreation road, or trail) or use area (recreation cabin or anchorage).  |
| <b>Sensitive Species</b>          | Animal and plant species identified by the Regional Forester as potentially susceptible or vulnerable to activity impacts or habitat alterations and, therefore, in need of special considerations during land management activity planning.   |
| <b>Silviculture</b>               | The theory and practice of managing forest vegetation. Silviculture involves the appropriate application of ecological, social, and economic principles of vegetative management to achieve resource management objectives and desired future forest conditions.   |
| <b>Silvicultural Prescription</b> | Detailed direction about methods, techniques, timing, and monitoring of vegetative treatments. A prescription is prepared by a silviculturalist who uses interdisciplinary input to best achieve established objectives, direction, and requirements for land managed by the Forest Service.   |
| <b>Silvicultural System</b>       | A management process whereby forests are tended, harvested, and replaced resulting in a forest of distinctive form. Systems are classified according to the method of carrying out the process. (See single-tree selection, group selection, two-aged management, and clearcut with reserves.)   |
| <b>Single-tree Selection</b>      | A silvicultural system used to develop and maintain uneven-aged stands by removal of selected trees from specified age classes over the entire stand area in order to meet a predetermined goal of age distribution and species in the remaining stand.  |
| <b>Site Index</b>                 | A measure of the relative productive capacity of an area for growing wood. Measurement of site index is based on height of the dominant trees in a stand at a given age.   |

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| <b>Sortyard</b>                         | A location used to sort grades, types, and size of logs.   |
| <b>Stream Class</b>                     | <p>A means to categorize stream channels based on their fish production values. There are four stream classes defined by the Forest Plan. They are:</p> <p><i>Class I.</i> Streams and lakes with anadromous or adfluvial fish habitat; or high quality resident fish waters listed in Appendix 68.1, Region 10 Aquatic Habitat Management Handbook (FSH 2609.24), June 1986; or habitat above fish migration barriers known to be reasonable enhancement opportunities for anadromous fish.</p> <p><i>Class II.</i> Streams and lakes with resident fish populations and generally steep (6-15 percent) gradient (can also include streams from 0-5 percent gradient) where no anadromous fish occur, and otherwise not meeting Class I criteria. These populations have limited fisheries values and generally occur upstream of migration barriers or have other habitat features that preclude anadromous fish use.</p> <p><i>Class III.</i> Perennial and intermittent streams with no fish populations but which have sufficient flow or transport sediment and debris to have an immediate influence on downstream water quality or fish habitat capability. These streams generally have bankfull widths greater than five feet and are highly incised into the surrounding hillslope.</p> <p><i>Class IV.</i> Intermittent, ephemeral, and small perennial channels with insufficient flow or sediment transport capabilities to have an immediate influence on downstream water quality or fish habitat capability. These streams generally are shallowly incised into the surrounding hillslope.</p> <p><i>Non-streams.</i> Rills and other watercourses, generally intermittent and less than one foot in bankfull width, little or no incisement into the surrounding hillslope, and with little or no evidence or scour.</p> |
| <b>Tentatively Suitable Forest Land</b> | <p>Forest land that is producing or is capable of producing crops of industrial wood and:</p> <ol style="list-style-type: none"> <li>has not been withdrawn by Congress, the Secretary of Agriculture, or the Chief of the Forest Service;</li> <li>existing technology and knowledge is available to ensure timber production without irreversible damage to soils productivity, or watershed conditions;</li> <li>existing technology and knowledge, as reflected in current research and experience, provides reasonable assurance that it is possible to restock adequately within five years after final harvest; and</li> <li>adequate information is available to project responses to timber management activities.</li> </ol>   |
| <b>Threatened Species</b>               | Any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range and which has been designated in the Federal Register by the Secretary of the Interior as a threatened species.   |
| <b>Tiering</b>                          | Elimination of repetitive discussions of the same issue by incorporating by reference the general discussion in an environmental impact statement of broader scope. For example, this EIS is tiered to the Forest Plan EIS.  |
| <b>Tongass Timber Reform Act (TTRA)</b> | This act requires annual appropriations for timber management on the Tongass National Forest, with a provision providing for the multiple use and sustained yield of all renewable forest resources.   |
| <b>Two-aged Management</b>              | A silvicultural method in which the majority of the trees in a harvest unit are cut in one entry, and the rest (about 10-20 percent of the unit) are left as residual trees, either singly   |

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or in patches. The residual trees remain unharvested to provide structural diversity and older-aged trees within the second-growth stand.

### Uneven-aged Management

The application or actions needed to maintain high-forest cover, recurring regeneration of desirable species, and development of trees through a range of diameter or age classes. Cutting methods that develop and maintain uneven-aged stands are single-tree selection and group selection.

### Utility Volume

Logs that do not meet minimum requirements for sawtimber but are suitable for other commercial uses.

### Value Comparison Unit (VCU)

A distinct geographic area that generally encompasses a drainage basin containing one or more large stream systems. Boundaries usually follow easily recognizable watershed divides. These units were established in the Forest Plan to provide a common set of areas for which resource inventories could be conducted and resource value interpretations made.

### Viewshed

A distinct area of land visible from identified travelways (boat route, recreation road, or trail) or use areas (recreation cabin or anchorage).

### Visual Quality Objective (VQO)

A desired level of scenic quality and diversity of natural features based on physical and sociological characteristics of an area. Refers to the degree of acceptable alterations of the characteristic landscape.

*Adopted VQO.* The VQO to be achieved as a result of management direction identified in the approved Forest Plan. Adopted VQOs represent the visual resource objective for the Forest Land Management Plan period, normally 10 years. (FSH 2309.22, R-10 Landscape Management Handbook.)

*Retention.* Management activities are not evident to the casual Forest visitor.

*Partial Retention.* Management activities may be evident, but are subordinate to the characteristic landscape.

*Modification.* Management activities may dominate the characteristic landscape but will, at the same time, use naturally established form, line, color, and texture. It should appear as a natural occurrence when viewed as middleground (1/4 to 5 miles from viewer.)

*Maximum Modification.* Management activities may dominate the characteristic landscape, but should appear as a natural occurrence when viewed as background.

### Volume Strata

Divisions of old-growth timber volume derived from the aerial photo interpreted timber type data (TIMTYP) and the soils data (CLU). Three volume strata (low, medium, and high) are recognized in the Forest Plan.

### Wildlife Analysis Area (WAA)

A division of land used by the Alaska Department of Fish and Game for wildlife analysis.

### Wetlands

Areas that are inundated by surface or ground water with a frequency sufficient, under normal circumstances, to support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include muskegs, marshes, bogs, sloughs, potholes, river overflows, mud flats, wet meadows, seeps, and springs.

# Abbreviations and Common Acronyms

|               |   |
|---------------|---|
| <b>ANILCA</b> | Alaska National Interest Lands Conservation Act |
| <b>ASQ</b>    | Allowable Sale Quantity                         |
| <b>AFHA</b>   | Anadromous Fisheries Habitat Assessment         |
| <b>DEIS</b>   | Draft Environmental Impact Statement            |
| <b>FEIS</b>   | Final Environmental Impact Statement            |
| <b>GIS</b>    | Geographic Information System                   |
| <b>HSI</b>    | Habitat Suitability Index (1.0 is optimum)      |
| <b>IDT</b>    | Interdisciplinary Team                          |
| <b>LUD</b>    | Land Use Designation                            |
| <b>LTF</b>    | Log Transfer Facility                           |
| <b>MBF</b>    | Thousand Board Feet                             |
| <b>MIS</b>    | Management Indicator Species                    |
| <b>MMBF</b>   | Million Board Feet                              |
| <b>MMCF</b>   | Million Cubic Feet                              |
| <b>NEPA</b>   | National Environmental Policy Act of 1969       |
| <b>NFMA</b>   | National Forest Management Act                  |
| <b>OGRs</b>   | Old-Growth Habitat Reserves                     |
| <b>ROS</b>    | Recreation Opportunity Spectrum                 |
| <b>TTRA</b>   | Tongass Timber Reform Act                       |
| <b>VCU</b>    | Value Comparison Unit                           |
| <b>VQO</b>    | Visual Quality Objective                        |
| <b>WAA</b>    | Wildlife Analysis Area                          |



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# Interdisciplinary Team

|                       |             |  |
|-----------------------|-------------|--|
| <b>Rob Aiken</b>      | Position:   | Civil Engineer/Transportation Planner            |
|                       | Experience: | 15 years with the Forest Service                 |
|                       | Education:  | BS Forest Engineering                            |
| <b>Steve Alarid</b>   | Position:   | GIS Analyst                                      |
|                       | Experience: | 14 years with the Forest Service                 |
|                       | Education:  | BS Forest Management<br>MF Forest Engineering    |
| <b>Mary Clemens</b>   | Position:   | Recreation Planner                               |
|                       | Experience: | 18 years with the Forest Service                 |
|                       | Education:  | BS Forestry                                      |
| <b>Joe Doerr</b>      | Position:   | Wildlife Biologist                               |
|                       | Experience: | 11 years with the Forest Service                 |
|                       | Education:  | BS Biological Sciences<br>MS Wildlife Management |
| <b>Sandy Dixon</b>    | Position:   | Civil Engineering Technician                     |
|                       | Experience: | 13 years with the Forest Service                 |
| <b>Dave Helmick</b>   | Position:   | Transportation Planner                           |
|                       | Experience: | 30 years with Forest Service                     |
| <b>Rich Jennings</b>  | Position:   | Silviculturist                                   |
|                       | Experience: | 20 years with the Forest Service                 |
|                       | Education:  | BS Forestry<br>Silviculture Certification        |
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|                       | Experience: | 10 years with the Forest Service                 |
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## References

|                      |             |                                  |
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|                      | Education:  | BS Archaeology                   |
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|                      | Education:  | Associates Forestry              |

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# **Appendix A**

## **Activity Cards**



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# Appendix A

## Unit Cards

### Introduction

The following section discusses the proposed management activities for the Crystal Creek Planning Area. These activities include: 1) timber harvest units, 2) proposed and existing roads needed for timber harvest, 3) future management of these roads, 4) construction of a recreation site, and 5) wetland enhancements. Both narratives and maps showing site-specific information are provided.

### Silvicultural Prescriptions for Timber Harvest

Harvest prescriptions have been developed by a silviculturist to meet objectives identified by the interdisciplinary planning team. This EIS presents a variety of harvest prescriptions which are tailored to site specific objectives. These objectives include biodiversity, soil and watershed protection, and moose forage production.

#### Clearcutting With Reserve Trees - Two-aged Management

Approximately 15 percent of the basal area (either in groups or scattered) will be retained, creating a two-layered canopy structure with two or more age-classes. Where low value trees exist and where it is feasible with the logging system, greater than 15 percent of the basal area may be retained. Trees will be selected for stand structure based on windfirmness, operational feasibility and safety, and wildlife habitat value. The number and distribution of the leave trees will depend on the logging design as shown on the implementation cards and the amount of stand structure available which meets the selection criteria. If the units are designed for cable yarding, approximately 15% of the basal area will be left in clumps and stringers along yarding split lines and roads. Where shovel logging is used in stands with high defect more trees will be retained and these can be more evenly distributed across the unit. These additional trees may be non-merchantable or have low-economic value. Retention of snags is also desirable where they do not compromise safe operations. The Forest Plan recommends that the biological rotation length will range from 85 years on highly productive sites to 160 years on low productivity sites. Portions of the Ess Lake watershed have the rotation extended to about 165 years to maintain scenic quality.

The main objective of reserve trees is to provide biological and structural diversity in stands by leaving green trees which are not planned to be harvested in the future. Units are designed to maintain scenery, riparian habitat, unstable soils, and wildlife habitat. The likelihood of windthrow within stream buffers and adjacent stands is also evaluated.

Regrowth of trees on clearcuts previously harvested within the planning area has been rapid. It is expected that this regeneration will need to be thinned approximately twenty years following harvest. Spacing will be approximately 16 feet between trees providing room for diameter growth for the remaining trees. Natural openings, with relatively few trees, may provide sites for preferred wildlife browse since there will be little competition with the trees. Some unthinned patches (100' diameter) may be distributed throughout the thinned areas to provide cover for wildlife. The thinning will leave dominant trees which

are free of insect and disease infestation, as well as, physical deformities such as breakage, forked tops, and stem fluting. Yellow-cedar will be favored for retention in the thinning process.

Some stands may require two or more thinnings and possibly prunings to maintain understory for wildlife browse.

### **Group Selection - Uneven-aged Management**

Group Selection would remove trees in groups less than two acres in size to form a mosaic of irregular openings within the stand. Each opening will regenerate creating a patch of trees with a uniform age and height. At the end of the rotation, the result will be an uneven-aged stand. Group selection provides a residual tree canopy following harvest which would benefit scenery, wildlife, and soil stability.

Each group harvested will consist of a mixture of tree sizes to avoid selecting only the most merchantable trees. Groups of trees infected with dwarf mistletoe will be high priority for harvest.

There were three different group selection prescriptions developed:

- 10% of the basal area removed on each entry, spaced 20 years between entries, usually less than 1 acre in size (200-year rotation). This will emulate gap-phase stand development (small openings created in stands with minimal disturbance when one tree at a time drops from the canopy through blowdown or death).
- 30% of the basal area removed on each entry, spaced 30 to 40 years between entries with 10% reserve trees (90- to 120-year rotation). Groups of trees will usually be 1 to 2 acres in size. Ten percent of the basal area will be retained as reserve trees to more closely emulate old-growth stand characteristics following the final harvest.
- 40% of the basal area removed on the first entry with 30% removed on two subsequent entries, spaced about 30 to 40 years between entries (90 to 120 year rotation). Groups of trees will usually be 1 to 2 acres in size. No reserve trees will be retained at the final harvest. This system was designed to make group selection more economical while maintaining old-growth characteristics for the first two entries.

Cable, tractor and shovel yarding systems will be used. Windthrow may be minimized by designing the patches such that the longest axis of the patch is perpendicular to the dominant wind direction. On units which are to be cable-logged, the distribution and arrangement of the patches will be limited due to the capabilities of the logging equipment. Cable-logged harvest units will be in herring-bone patterns with each harvest strip being generally no more than two acres in size. Leave strips between the harvest strips will be harvested in future entries. Tractor and shovel yarding will be used on relatively flat ground. These systems provide more flexibility to leave specific trees and design unit shape than does cable yarding.

As in the clearcutting with reserves prescription, each group of trees will be monitored to ensure adequate restocking of all species to maintain species diversity. Approximately twenty years following harvest, the patches should be considered for potential thinning. Multiple thinnings may be necessary to maintain understory vegetation and develop a multi-storied canopy.

### **Single-Tree Selection - Uneven-aged management**

Within all units, except Unit 15, twenty percent of the basal area would be removed in each entry at 40-year cutting cycles by individually selecting trees. The rotation will be extended beyond the average rotation age (90 to 120 years) to 200 years. Because of the difficulty of removing individual trees, this prescription can be only used where shovel or tractor yarding is used. This prescription maximizes old-growth structural diversity in harvest units.

Due to the relatively small openings created by single-tree selection, regeneration and individual tree growth will be somewhat suppressed. Cedar, hardwoods, and the understory herbaceous species, in particular, will likely be suppressed more than hemlock and spruce. Regeneration will be closely monitored to ensure the cedar component is maintained through the next rotation. The need for thinning these units will be determined following monitoring.

Unit 15 is proposed for single-tree selection as part of an ongoing administrative study. One fourth of the unit will be established as a control which would have no trees harvested. The other part will be divided into three sections and harvested at 20%, 40%, and 60% removal of the basal area respectively. The previously harvested personal-use timber will be included when calculating the basal area to be removed. The primary objective is to study the effects of varying intensities of single tree harvest on moose and deer winter use of the stand. This is an expansion of the administrative study in a nearby forest stand where 20% and 40% of the basal area of old-growth had been removed to study deer and moose use. The percent removed in subsequent entries can be prescribed based upon the results of this administrative study. Shovel-and/or tractor yarding will be utilized in this harvest.

### **Mitigation Measures**

#### **Archaeology**

As directed in the Heritage Resources Forest-wide Standards and Guidelines, if a site is discovered during project implementation, work shall be suspended by the layout forester or sale administrator to avoid potential site damage. The Forest or District Archaeologist shall be notified to assess site significance and consider eligibility status to the National Register of Historic Places. The Assistant Forest Supervisor shall notify the State Historic Preservation Office and authorize resumption of work only after the consultation process has been completed.

#### **Scenery**

The guidelines for scenery differs within the three Land Use Designations that allow timber harvest. See Figure A-1, which shows which guidelines are applicable for each unit.

#### **Scenic Viewshed LUD**

The Forest Plan directs that timber harvest within the Forest Plan Scenic Viewshed Land Use Designation retain a natural-appearing landscape over time, as viewed from Visual Priority Travel Routes and Use Areas. Within these viewsheds, timber harvest units are typically small and affect only a fraction of the seen area. Areas topographically screened from Visual Priority Travel and Use Areas may be heavily modified.

The scenic requirements are accomplished by applying Visual Quality Objectives (VQO) of Retention in the Foreground viewing area, and Partial Retention within the Middleground and Background viewing area. In those areas not visible from Visual Priority Travel Routes and Use Areas, the Maximum Modification VQO would be applied. Techniques and mitigation to achieve these objectives may include: silvicultural treatment, unit size, allowable cumulative visual disturbance, green tree retention, visual screening, and boundary modification.



### **Modified Landscape LUD**

The primary scenic objective in implementing timber harvest within the Forest Plan Modified Landscape Land Use Designation is to minimize development in the near viewing area while allowing a sustained yield of timber and mix of other resource activities in other viewing areas over time.

The scenic requirements are accomplished by applying the Adopted Visual Quality Objectives of Partial Retention within the Foreground viewing area, while the Modification VQO is applied in the Middleground/Background distance zones as viewed from Visual Priority Travel Routes and Use Areas. The Maximum Modification VQO is applied to all other locations. Techniques and mitigation to achieve these objectives are similar to those applied within the Scenic Viewshed Land Use Designation.

### **Timber Production LUD**

The primary scenic objective in implementing timber harvest within the Forest Plan Timber Production Land Use Designation is to achieve visual characteristics similar to natural occurrences in the near viewing area while allowing a sustained yield of timber.

The scenic requirements are accomplished by applying the Adopted Visual Quality Objectives of Modification within the Foreground viewing area from Visual Priority Travel Routes and Use Areas. The Maximum Modification VQO is applied to all other locations. Techniques and mitigation to achieve these objectives in areas of scenic concern are similar to those applied within the Scenic Viewshed Land Use Designation.

## **Water Quality, Soils, and Fisheries**

All known Class I, II, and III streams are shown on the unit card maps in relation to the location of existing roads and approximate location of proposed roads. Any additional streams, if found will be protected by following the Forest Plan Riparian Standards and Guidelines. Timing restrictions for instream work are located on the road cards.

Site-specific locations of potentially unstable soils on steep slopes were located during field surveys. These areas will be excluded from timber harvest, with unit design or by retention of green trees in those areas.

Small Class IV streams are more numerous and are not generally shown. Class IV streams will be protected following Best Management Practices (Forest Plan, Appendix C).

Some disturbance of forested wetlands is expected to result from timber harvest. These impacts will be short-term until regeneration of vegetation occurs. Most of the smaller inclusions can be avoided through logging system design and the retention of green trees.

Forested wetland soils of the Kaikli, Karheen, Kitkun, and Maybeso soil series are excluded from timber harvest in the Record of Decision for the Forest Plan. Harvest is proposed on some wetland sites other than these four soils and units have been designed to avoid the soils. Further field investigation during implementation may change unit design.

## **Wildlife**

### **Raptor and Great Blue Heron Nests**

All timber harvest units in the proposed action will be searched for raptor and heron nests prior to implementation. If nests are found, habitat buffers will be established around the nests in accordance with Forest Plan Standards and Guidelines to protect the nest sites. Timing restrictions will be placed on activities around the nests during active nesting and fledging periods to minimize disturbance to the birds using the nests. Standards used to protect nest sites vary depending on the type of nest located.

For all confirmed active hawk, owl, or great blue heron nests (except osprey and goshawk), a 600-foot forested windfirm buffer will be established around the nest. New road construction will not be allowed within the nest habitat buffer unless no other reasonable road alternatives exist outside the buffer. Activities that are likely to result in nest abandonment will not be permitted within 600 feet of an active nest during the nesting period (generally March 1 to August 15). The no-activity buffer may be increased if field conditions indicate that more restrictions are necessary to minimize nest disturbances. Heron and hawk nests will be monitored for use for at least two years after discovery. If the nest sites are shown to be inactive for two consecutive years, the nest buffer protection may be removed.

For all confirmed or probable goshawk nests, a minimum of 100 acres of productive old-growth around the site will be maintained as nesting habitat. New road construction will not be allowed within this area unless no other reasonable road alternatives exist. Activities that are likely to result in nest abandonment will not be permitted within 600 feet on an active nest from March 15 to August 15. Nest habitat protection measures will be maintained but timing restrictions will be removed if nests become inactive.

For all confirmed osprey nests, a minimum 330-foot habitat management area will be established around each nest tree. The exact boundary will be based on local topography, timber type, a reasonable assurance of windfirmness, and other factors. Timber harvest within the osprey nest zone will be designed to maintain the windfirmness of nest and reserve trees. Trees retained within the nest area will include the nest tree, a minimum of three of the largest broken-top trees or snags for alternative nest trees, a minimum of eight dominant or co-dominant trees with large branches suitable for perching, and a minimum of 24 subdominant live trees for future nest and perch sites. Trees that are known to be used by osprey for perching should be selected for retention as perch trees. Activities that are likely to result in nest abandonment will not be permitted within 600 feet of an active nest from April 15 to August 31. The no-activity buffer and timing restriction period may be increased if field conditions indicate that more restrictions are necessary to minimize nest disturbances. Nest habitat protection measures will be maintained but timing restrictions will be removed if nests become inactive.

### **Waterfowl Nesting and Brood-Rearing**

Wetlands that are known or likely to be used by waterfowl for nesting, brooding, and rearing have been identified. Buffers of 330-foot width have been placed around these wetlands. Within this buffer, harvest is generally limited to single tree selection of 40% or less, or group selection harvest. Timing clauses have been placed on these buffers and on adjacent units to restrict logging and roading activities generally during the period April 1 to July 31. Some large-diameter live trees may be topped within the units to provide for future nest sites. Snags and dying trees will be emphasized for retention of reserve trees.

### **Loss of Old-Growth Habitat**

Loss of old-growth habitat is a wildlife concern for most of the proposed harvest units. This concern is mitigated within the project area by the retention of old-growth reserves, beach-fringe and riparian buffers, old-growth connectivity corridors, and by old-growth habitat classed as unsuitable for timber production. Some areas of old-growth habitat provide winter range for deer, mountain goat, and moose. Many of these more important areas have been avoided through selection of units and unit design. Other methods to mitigate against the loss of old-growth habitat include single-tree selection harvest, group-selection harvest, and retaining reserve trees within clearcut harvest units.

Single-tree selection harvest will generally remove only 20% of the existing stands and leave all age and size of trees within the resultant stand. Examination of existing units

within the project area suggest that old-growth dependent wildlife species will continue to inhabit the stands after logging.

Group-selection harvest reduces the size of the harvested opening to two acres or less and maintains old-growth habitat next to the harvested opening. This harvest method attempts to mimic blowdown. As a whole, the stand should provide some habitat for old-growth species.

Within clearcut with reserves harvest units, about 15% or more of the stand will be left as reserve trees to preserve some old-growth legacy. Reserve trees will include all ages and sizes of trees with emphasis on snags and dying trees for snag recruitment. Trees retained should have reasonable assurance of windfirmness.



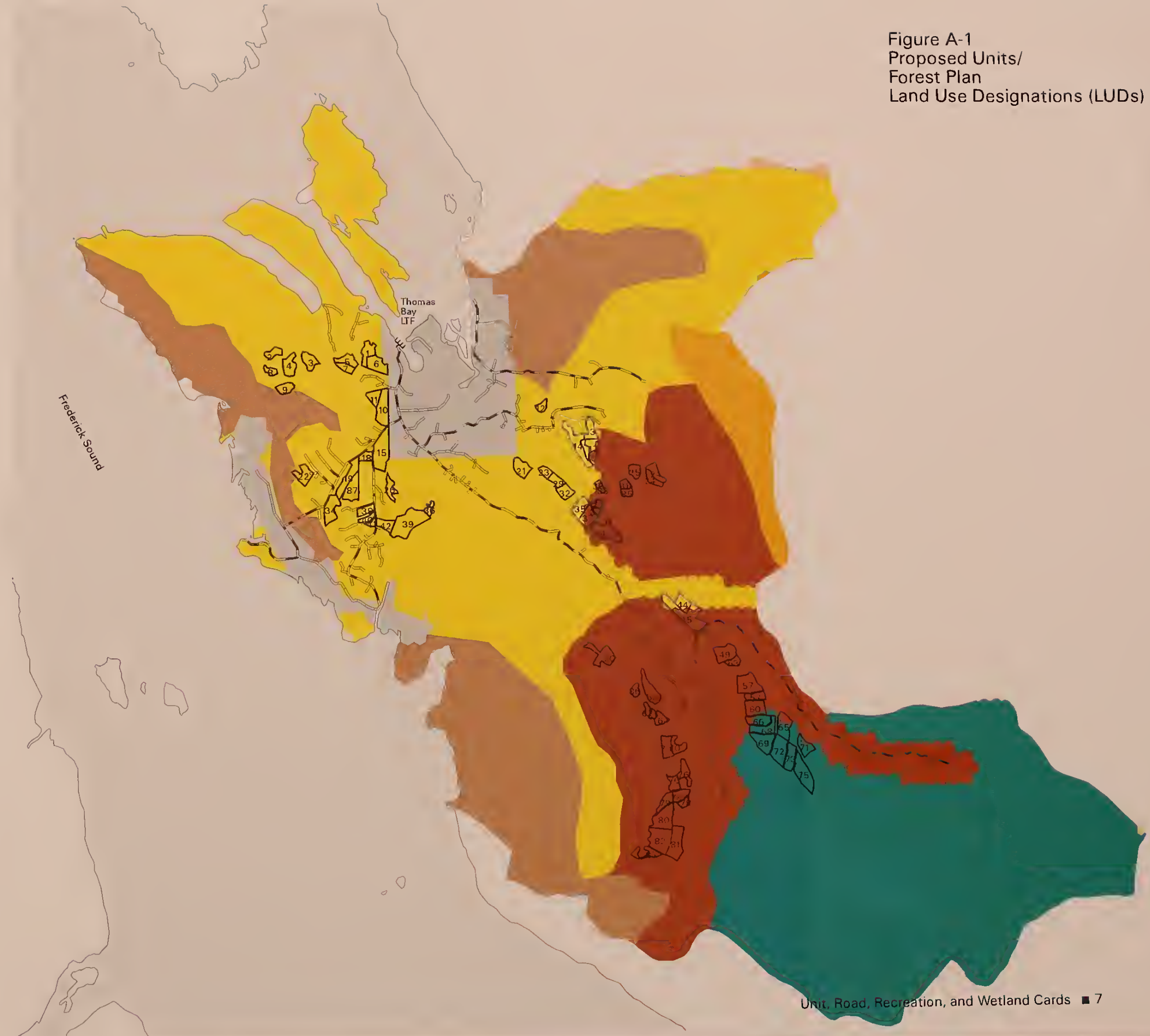
# Legend

- Old-Growth Habitat LUD \*
- Special Interest Area (SIA) LUD
- Modified Landscape LUD
- Scenic Viewshed LUD
- Timber Production LUD
- Non-National Forest Lands
- Crystal Creek Project Area Boundary
- Existing Permanent Roads
- Existing Closed Roads
- Shoreline
- Units with Unit Numbers \*\*
- Saltwater
- Log Transfer Facility (LTF)

\*All LUDs are from the Forest Plan

\*\*Each Alternative proposes to develop only a portion of the units shown.

Figure A-1  
Proposed Units/  
Forest Plan  
Land Use Designations (LUDs)



0 7920 15840  
Scale is 1 inch = 7920 feet



map: /gis/projects/crystal/plots/feisplots/altmodrx.map 10/20/98  
macros: feismap.aml, altmodrx.aml





# Unit Cards

**Crystal Creek Unit Card**  
**Unit 1**

Acres: 33      Alternative (s): 5      MBF Volume: 185      MCF Volume : 47  
1977 Aerial Photo: Flight #: 50      Photo #: 9

## **Resource Concerns and Mitigation**

### **Wildlife**

Concern: Goose nesting occurs within or adjacent to unit.

Mitigation: Use single-tree selection harvest method. Prohibit tree falling, yarding, and road construction within the unit during the period of April 1 to July 31.

### **Fisheries**

Concern: Class I lakes north and west of the unit.

Mitigation: No programmed timber harvest within 100 horizontal feet of lake margin or within the Riparian Management Area (greatest extent of riparian vegetation or soils or slope break ).

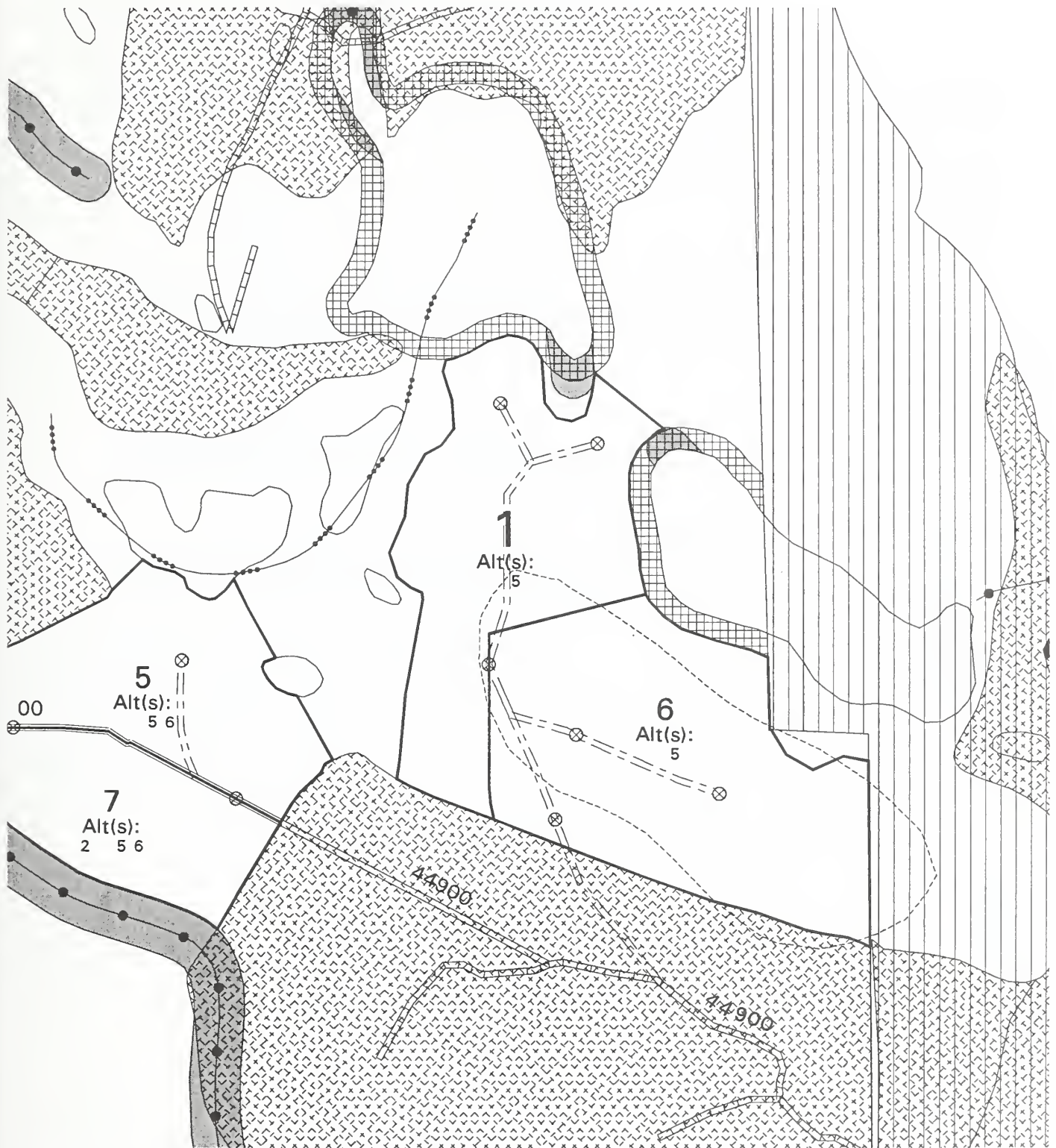
## **Silvicultural Prescription**

Single-tree selection - 20% removal.

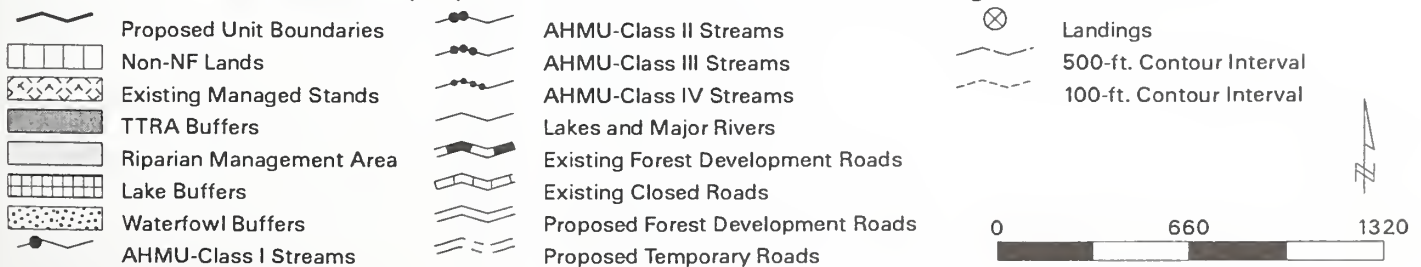
## **Logging System and Unit Design**

The north and west boundary follows slope breaks plus 100 feet for Class I lakes. The east boundary is common with unit 6 and the south boundary follows a managed stand. This unit is planned for shovel logging to minimize soil disturbance and meet silvicultural prescription.

# Crystal Creek Timber Harvest Unit 1



Alternatives that include the proposed units are listed beneath the larger unit numbers.





**Crystal Creek Unit Card**  
**Unit 2**

Acres: 19      Alternative (s): 2 and 6      MBF Volume: 242      MCF Volume : 79  
1977 Aerial Photo: Flight #: 49      Photo #: 152

**Resource Concerns and Mitigation**

**Wetlands**

Concern: Wetlands within the unit.

Mitigation: Wetter sites within the unit will be avoided where practicable and skid trails will be identified. Where possible, trees will be felled away from these sites to avoid filling with logging slash.

**Silvicultural Prescription**

Clearcut with reserves. Look for opportunities to retain more than 15% of the basal area by leaving unmerchantable or large trees with low-economic value.

**Logging System and Unit Design**

The unit boundary follows muskeg edges on the west and a Road 44900 on the east. Shovel logging is appropriate to meet unit objectives with a short spur.

# Crystal Creek Timber Harvest Unit 2



Alternatives that include the proposed units are listed beneath the larger unit numbers.



**Crystal Creek Unit Card**  
**Unit 3**

Acres: 29      Alternative (s): 2, 5 and 6      MBF Volume: 394      MCF Volume : 126  
1977 Aerial Photo: Flight #: 49      Photo #: 152

**Resource Concerns and Mitigation**

**Wetlands**

Concern: Wetlands within the unit.

Mitigation: Wetter sites within the unit will be avoided where practicable and skid trails will be identified. Where possible, trees will be felled away from these sites to avoid filling with logging slash.

**Silvicultural Prescription**

Clearcut with reserves. Look for opportunities to retain more than 15% of the basal area by leaving unmerchantable or large trees with low-economic value.

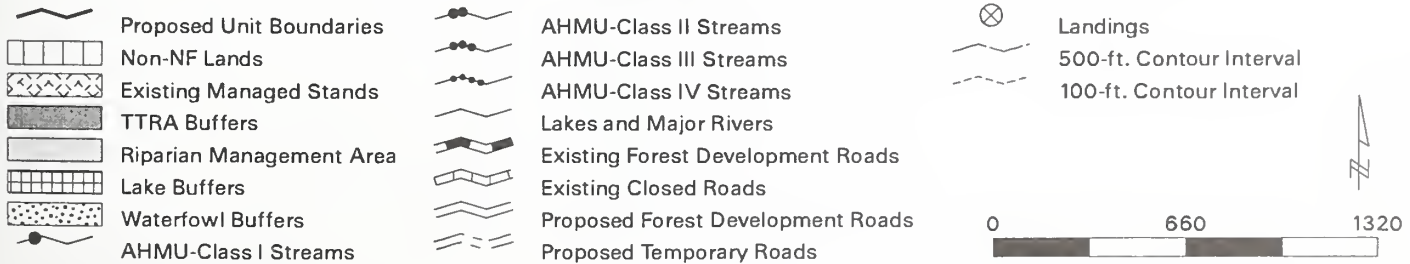
**Logging System and Unit Design**

The north boundary follows Road 44900. The rest of the boundary follows a muskeg fringe. A short spur is required to minimize shovel logging distances.

# Crystal Creek Timber Harvest Unit 3



Alternatives that include the proposed units are listed beneath the larger unit numbers.





**Crystal Creek Unit Card**  
**Unit 4**

Acres: 35      Alternative (s): 2 and 6  
1977 Aerial Photo: Flight #: 49

MBF Volume: 434  
Photo #: 152

MCF Volume : 139

## **Resource Concerns and Mitigation**

### **Fisheries**

Concern: Class II stream is located at the north end of the unit.

Mitigation: Maintain riparian management area of 120 feet which includes a no harvest a 100 foot TTRA buffer.

### **Wetlands**

Concern: Wetlands within the unit.

Mitigation: Wetter sites within the unit will be avoided where practicable and skid trails will be identified. Where possible, trees will be felled away from these sites to avoid filling with logging slash.

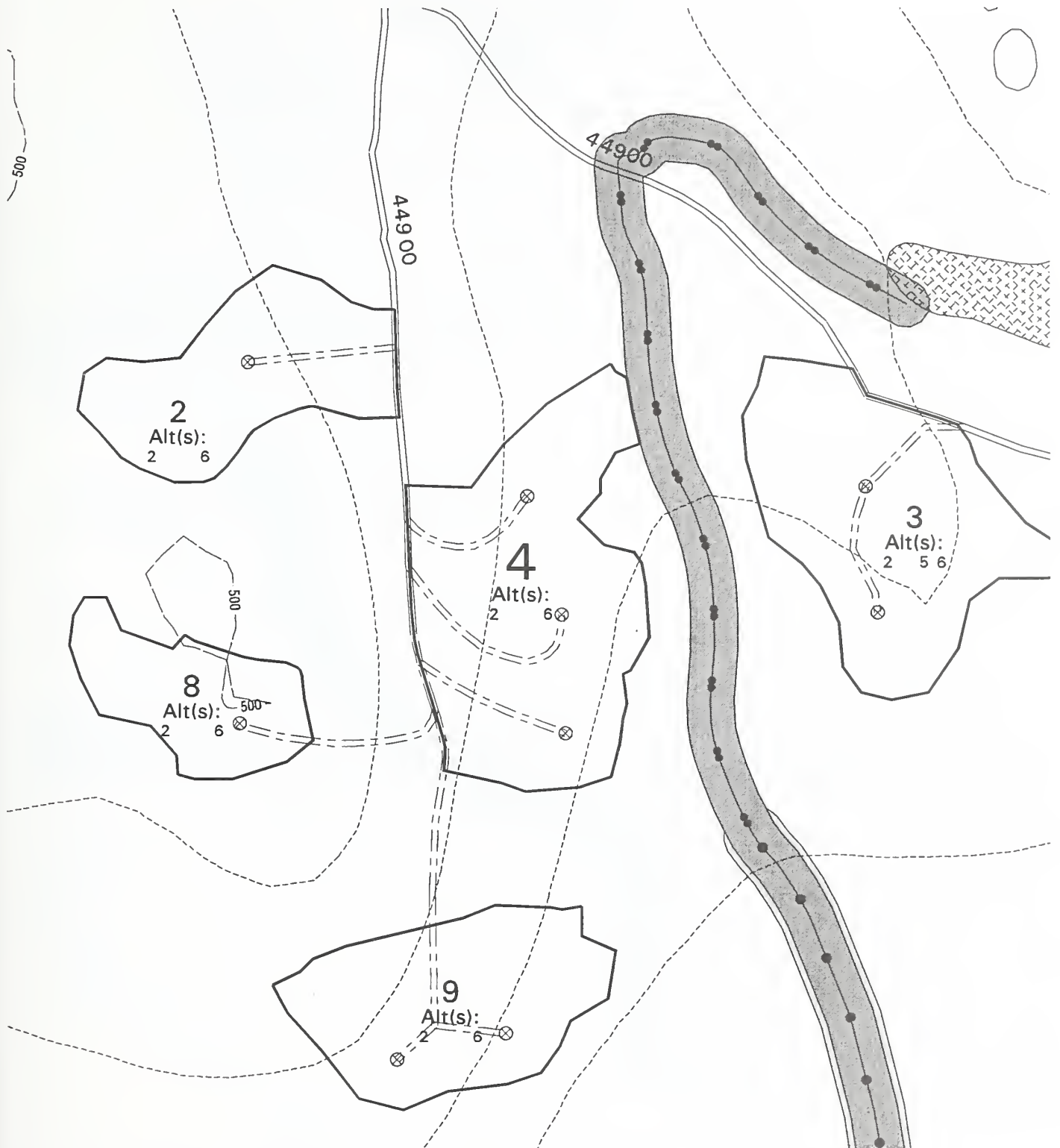
## **Silvicultural Prescription**

Clearcut with reserves. Look for opportunities to retain more than 15% of the basal area by leaving unmerchantable or large trees with low-economic value.

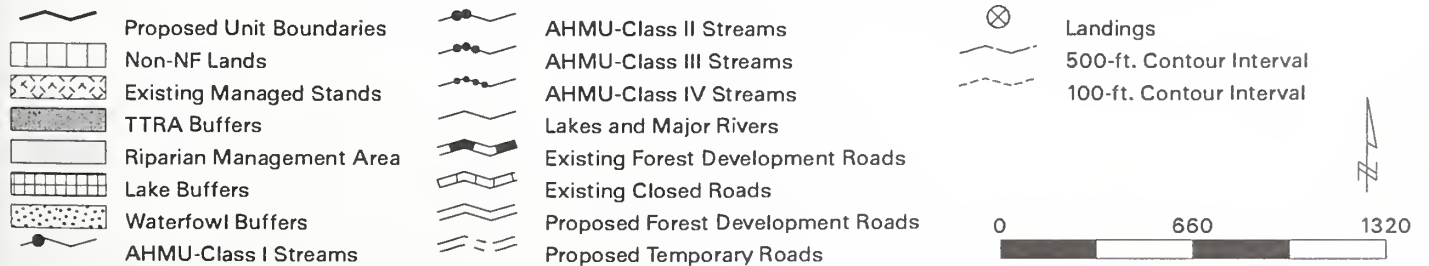
## **Logging System and Unit Design**

The east boundary follows a muskeg fringe; the west boundary follows the road. The north and south boundaries follow logical yarding boundaries. Three spurs will be required for a combination of shovel and cable logging.

# Crystal Creek Timber Harvest Unit 4



Alternatives that include the proposed units are listed beneath the larger unit numbers.



**Crystal Creek Unit Card**  
**Unit 5**

Acres: 26      Alternative (s): 5 and 6      MBF Volume: 114      MCF Volume : 30  
1977 Aerial Photo: Flight #: 49      Photo #: 152

**Resource Concerns and Mitigation**

**Wildlife**

Concern: Goose nesting occurs within or adjacent to unit.

Mitigation: Single tree selection. A waterfowl timing clause will prohibit timber harvest and temporary road construction within the unit from April 1 to July 31 to protect goose nesting and fledging. A construction timing clause, April 1 to June 30, on Road 44900, adjacent to the unit, will protect goose nesting.

**Fisheries**

Concern: Class I stream west of the unit.

Mitigation: Maintain a 100 foot no-cut commercial timber harvest buffer and a no programmed commercial timber harvest area to the greatest of the flood plain, riparian vegetation or soils, or riparian associated wetland fens.

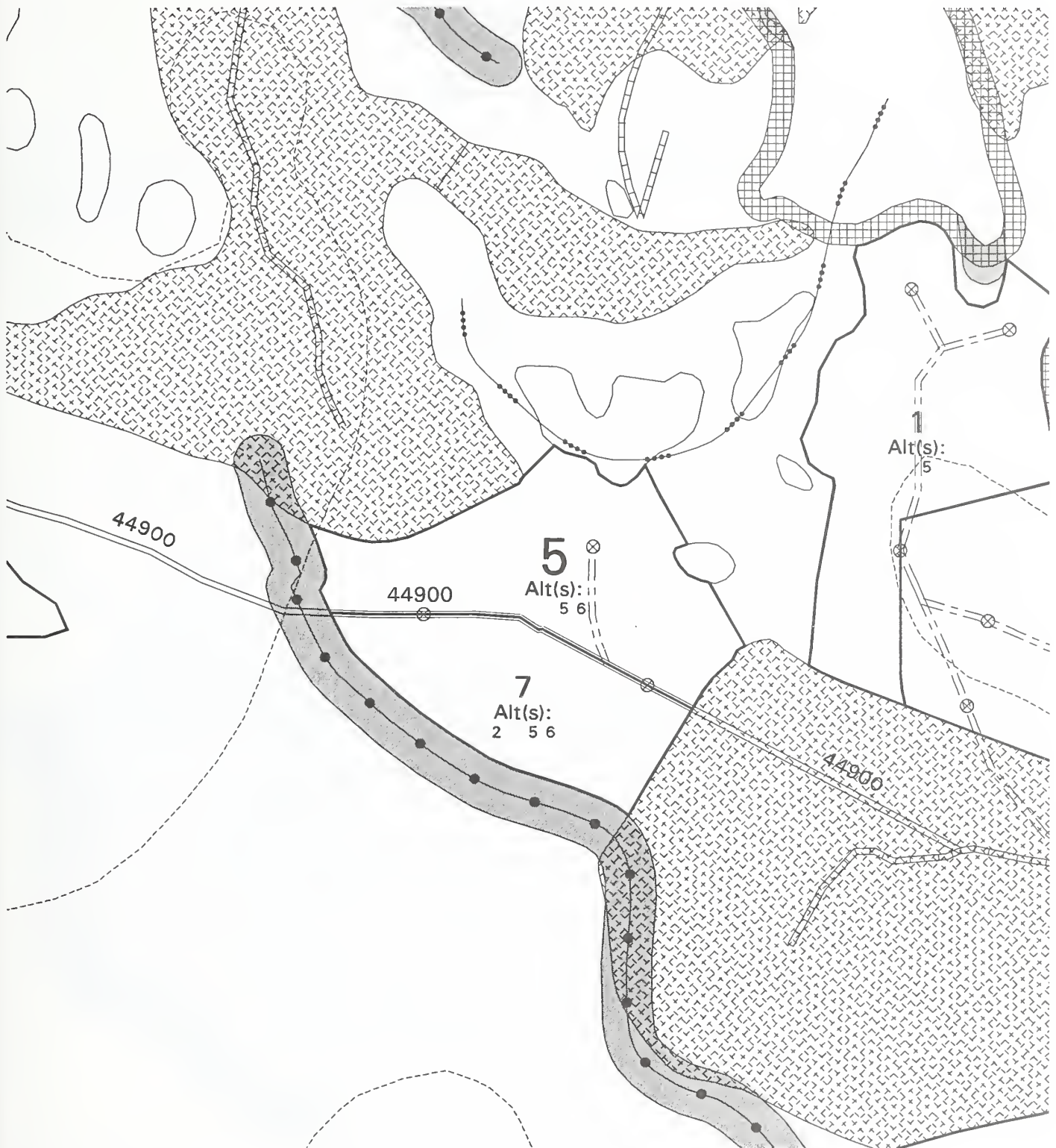
**Silvicultural Prescription**

Single tree selection - 20% removal

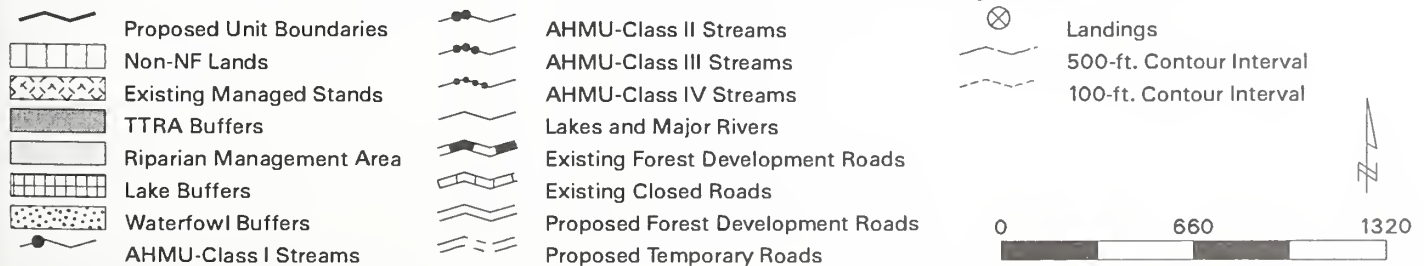
**Logging System and Unit Design**

Unit boundary follows a managed stand and small lakes to the north and east, maintain adequate windfirm buffer along lakes. The southern boundary follows Road 44900. A combination of shovel and cable yarding will be used. A short spur will be required.

# Crystal Creek Timber Harvest Unit 5



Alternatives that include the proposed units are listed beneath the larger unit numbers.





**Crystal Creek Unit Card**  
**Unit 6**

Acres: 42      Alternative (s): 5  
1977 Aerial Photo: Flight #: 50      Photo #: 9

MBF Volume: 235

MCF Volume: 59

## **Resource Concerns and Mitigation**

### **Wildlife**

Concern: Goose nesting occurs within unit.

Mitigation: Single tree selection. A waterfowl timing clause will prohibit road construction, timber harvest and other harvest activities from April 1 to July 31, to protect goose nesting and fledging.

### **Fisheries**

Concern: Class I lake north of unit.

Mitigation: No programmed commercial timber harvest within the Riparian Management area (at least 100 horizontal feet from the lake).

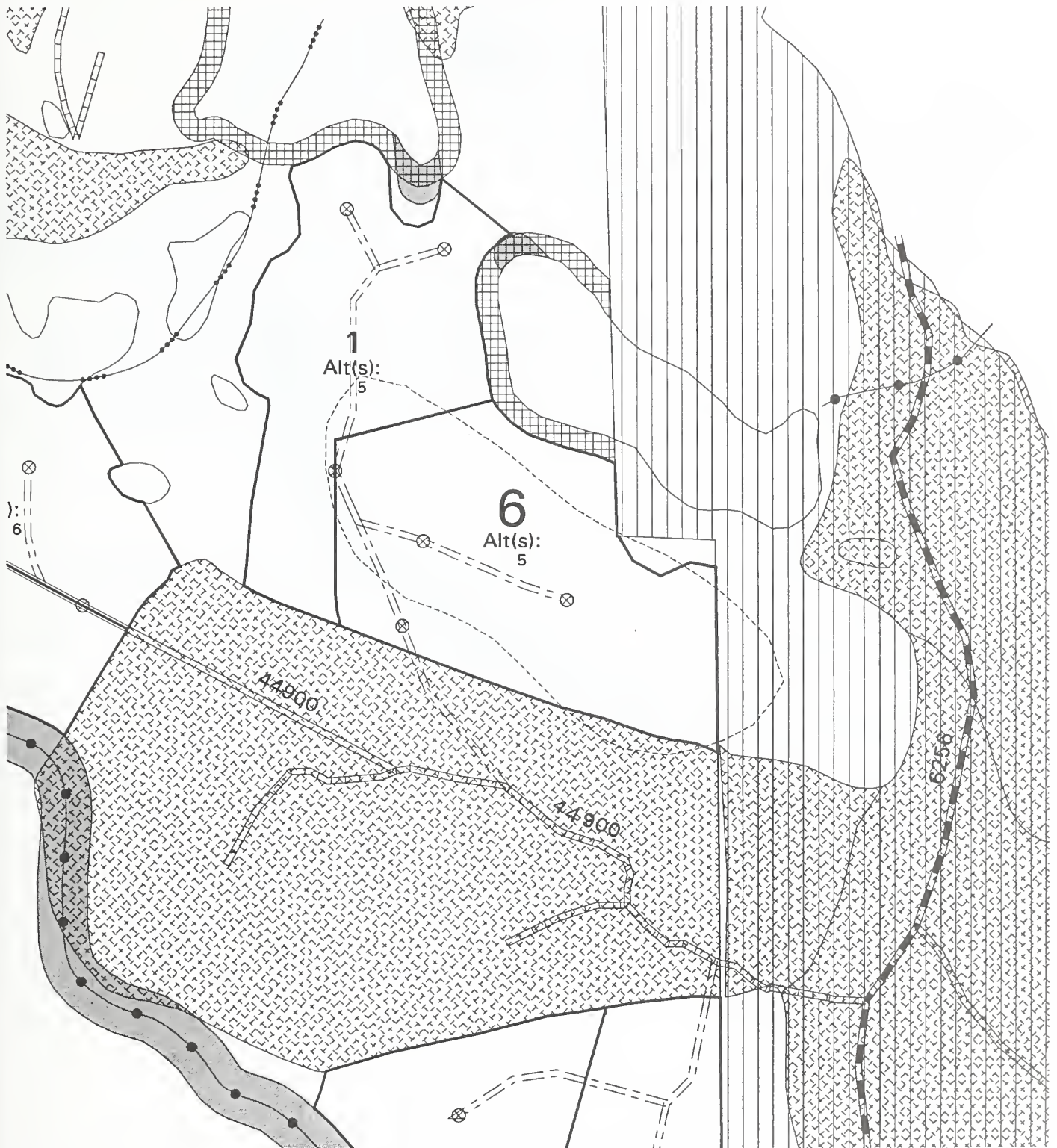
## **Silvicultural Prescription**

Single tree selection - removal 20%.

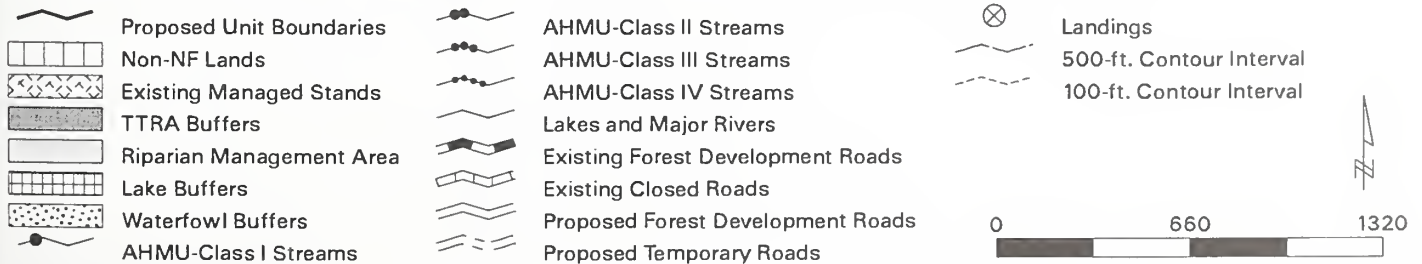
## **Logging System and Unit Design**

The north boundary follows a slope break along a lake buffer. The east boundary follows non-National Forest Land, and the south boundary follows a managed stand. The west boundary is common with Unit 1. Shovel logging is the preferred harvest method to meet resource concerns.

# Crystal Creek Timber Harvest Unit 6



Alternatives that include the proposed units are listed beneath the larger unit numbers.



## **Crystal Creek Unit Card**

### **Unit 7**

Acres: 19      Alternative (s): 2, 5, and 6 MBF Volume: 428, 104    MCF Volume: 112, 27  
1977 Aerial Photo: Flight #: 49      Photo #: 152

## **Resource Concerns and Mitigation**

### **Wildlife**

Concern: Goose nesting occurs within or adjacent to the unit.

Mitigation: A waterfowl timing clause will prohibit timber harvest within the unit from April 1 to July 31, and road construction of 44900, adjacent to the unit, from April 1 to June 30 to protect possible goose nesting use. Loss of goose habitat within the unit will be mitigated by the riparian management area. Some live spruce may be topped to provide nesting platforms for geese in Alts. 2 and 5. Use of single-tree selection will protect nesting habitat in Alt. 6. Retention of snag and reserve trees will provide some nesting habitat in Alts. 2 and 5.

### **Fisheries**

Concern: Class I stream to west of the unit.

Mitigation: Maintain a 100 foot no-cut commercial timber harvest buffer and a no programmed commercial timber harvest area to the greatest extent of the flood plain, riparian vegetation or soils, or riparian associated wetland fens.

## **Silvicultural Prescription**

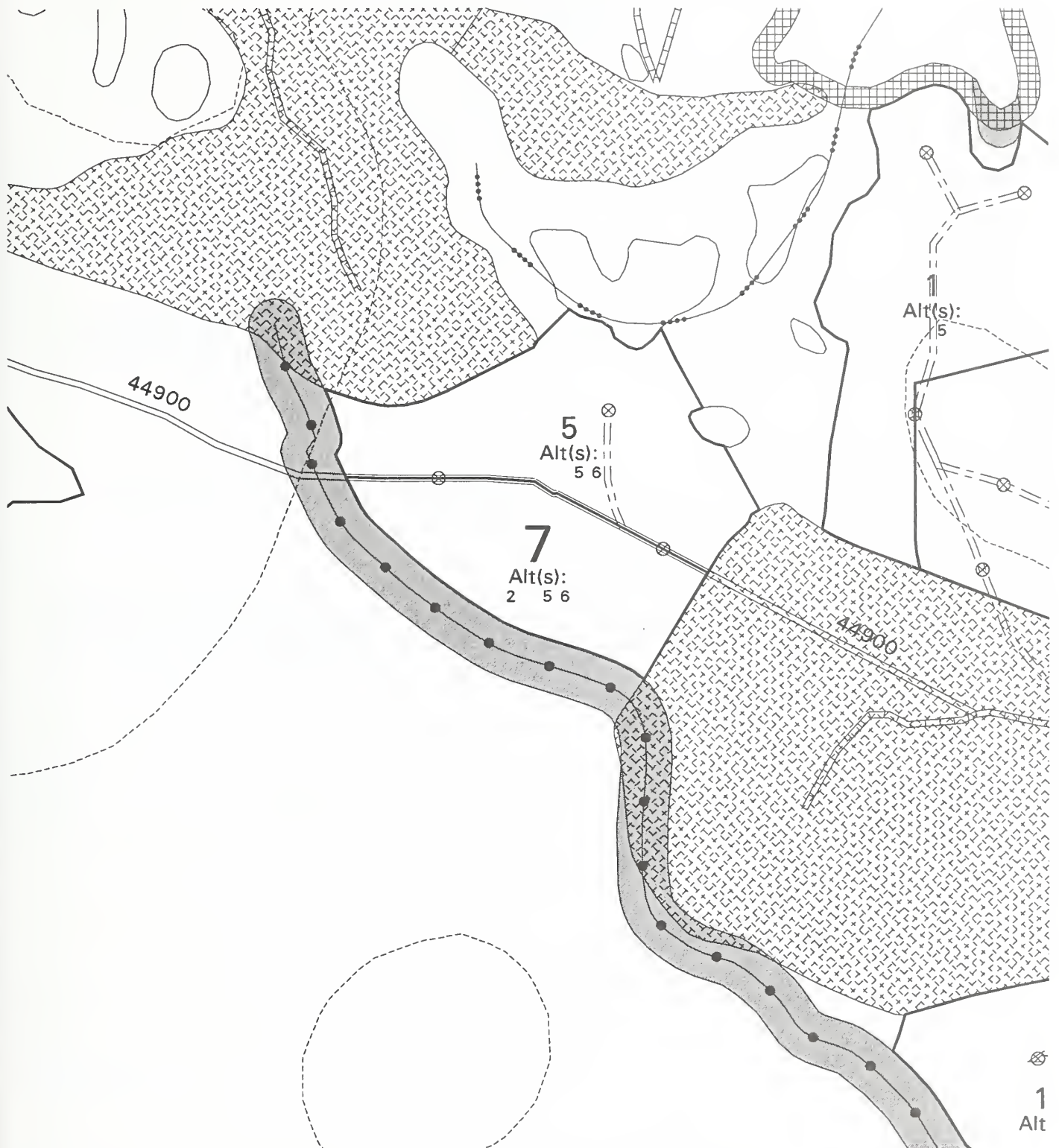
Clearcuts with reserves. Look for opportunities to retain more than 15% of the basal area by leaving unmerchantable or large trees with low-economic value. (Alternatives 2 and 5)  
Single-tree selection-20% removal (Alternative 6)

## **Logging System and Unit Design**

The unit boundary follows Road 44900 to the north; a stream is the southern boundary, and a managed stand is the eastern boundary. Shovel logging is the prescribed harvest system.



# Crystal Creek Timber Harvest Unit 7



Alternatives that include the proposed units are listed beneath the larger unit numbers.

- |  |                          |  |                                   |
|--|--------------------------|--|-----------------------------------|
|  | Proposed Unit Boundaries |  | AHMU-Class II Streams             |
|  | Non-NF Lands             |  | AHMU-Class III Streams            |
|  | Existing Managed Stands  |  | AHMU-Class IV Streams             |
|  | TTRA Buffers             |  | Lakes and Major Rivers            |
|  | Riparian Management Area |  | Existing Forest Development Roads |
|  | Lake Buffers             |  | Existing Closed Roads             |
|  | Waterfowl Buffers        |  | Proposed Forest Development Roads |
|  | AHMU-Class I Streams     |  | Proposed Temporary Roads          |

- Landings
- 500-ft. Contour Interval
- 100-ft. Contour Interval



Scale is 1 inch = 660 feet



**Crystal Creek Unit Card**  
**Unit 8**

Acres: 12      Alternative (s): 2 and 6      MBF Volume: 143      MCF Volume : 48  
1977 Aerial Photo: Flight #: 49      Photo #: 152

**Resource Concerns and Mitigation**

**Wetlands**

Concern: Wetlands within the unit.

Mitigation: Wetter sites within the unit will be avoided where practicable and skid trails will be identified. Where possible, trees will be felled away from these sites to avoid filling with logging slash.

**Silvicultural Prescription**

Clearcut with reserves. Look for opportunities to retain more than 15% of the basal area by leaving unmerchantable or large trees with low-economic value.

**Logging System and Unit Design**

The unit boundary follows muskeg fringe on the north and west sides, and logical yarding boundaries on the south and east sides. A short spur is required to minimize shovel logging distances.

# Crystal Creek Timber Harvest Unit 8



Alternatives that include the proposed units are listed beneath the larger unit numbers.



**Crystal Creek Unit Card**  
**Unit 9**

Acres: 22      Alternative (s): 2 and 6      MBF Volume: 262      MCF Volume : 88  
1977 Aerial Photo: Flight #: 49      Photo #: 152

## **Resource Concerns and Mitigation**

### **Wetlands**

Concern: Wetlands within the unit.

Mitigation: Wetter sites within the unit will be avoided where practicable and skid trails will be identified. Where possible, trees will be felled away from these sites to avoid filling with logging slash.

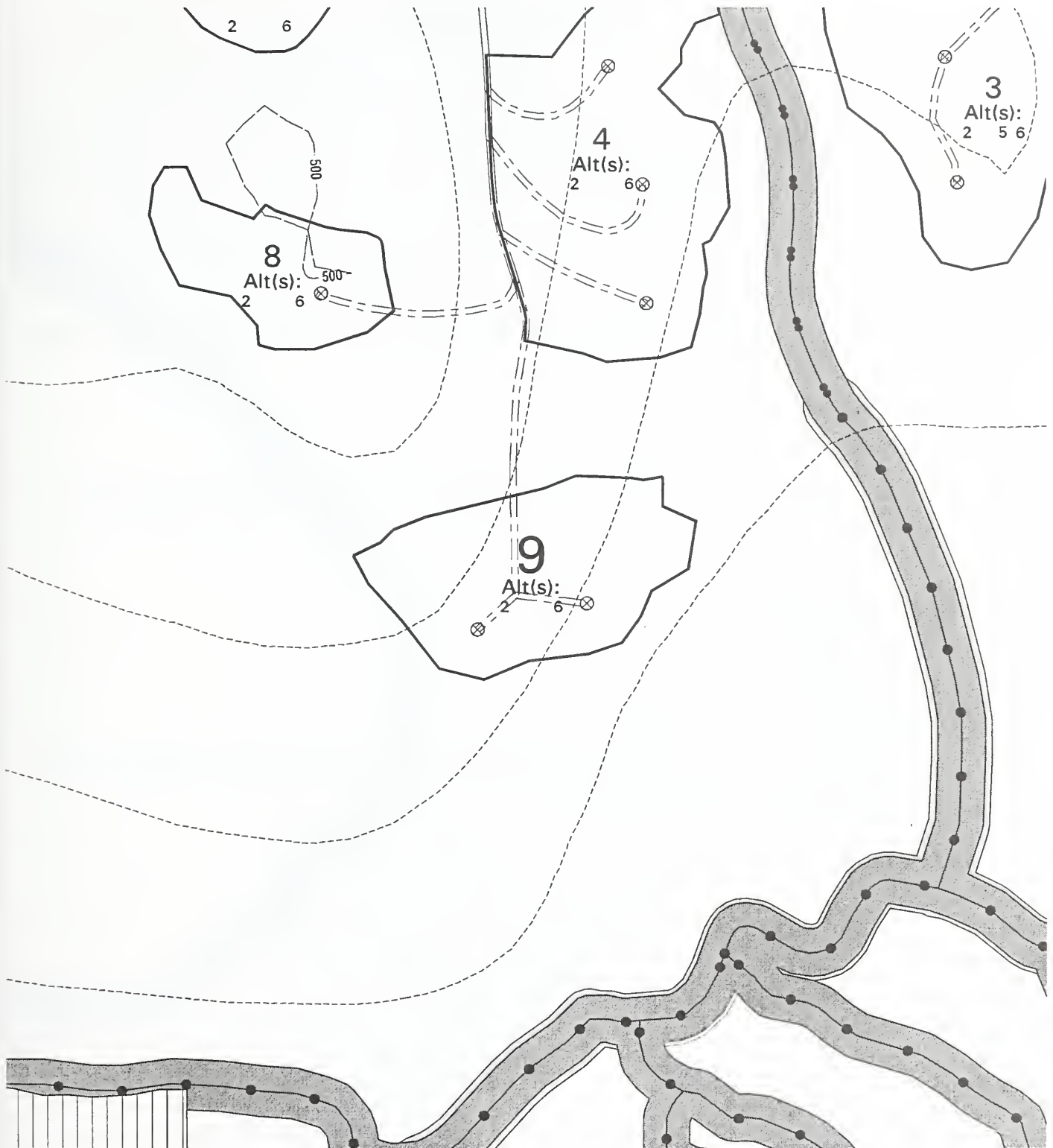
## **Silvicultural Prescription**

Clearcut with reserves. Look for opportunities to retain more than 15% of the basal area by leaving unmerchantable or large trees with low-economic value.

## **Logging System and Unit Design**

The unit boundary follows muskeg fringe on the east, south and west sides with the north boundary following logical yarding boundaries. A short spur with a fork will be required to accommodate a combination of shovel and cable yarding.

# Crystal Creek Timber Harvest Unit 9



Alternatives that include the proposed units are listed beneath the larger unit numbers.





**Crystal Creek Unit Card**  
**Unit 10**

Acres: 58      Alternative (s): 5 and 6      MBF Volume: 331      MCF Volume: 84  
1977 Aerial Photo: Flight #: 50      Photo #: 8

**Resource Concerns and Mitigation**

**Wildlife**

Concern: Goose nesting likely to occur within or adjacent to the unit.

Mitigation: Use single-tree selection harvest method. Prohibit tree falling, yarding, and road construction within the unit during the period of April 1 to July 31.

**Fisheries**

Concern: Class I stream to the west of the unit.

Mitigation: Maintain a 100 foot no-cut commercial timber harvest buffer and a no programmed commercial timber harvest area to the greatest extent of the floodplain, riparian vegetation, or soils, or riparian associated wetland fens.

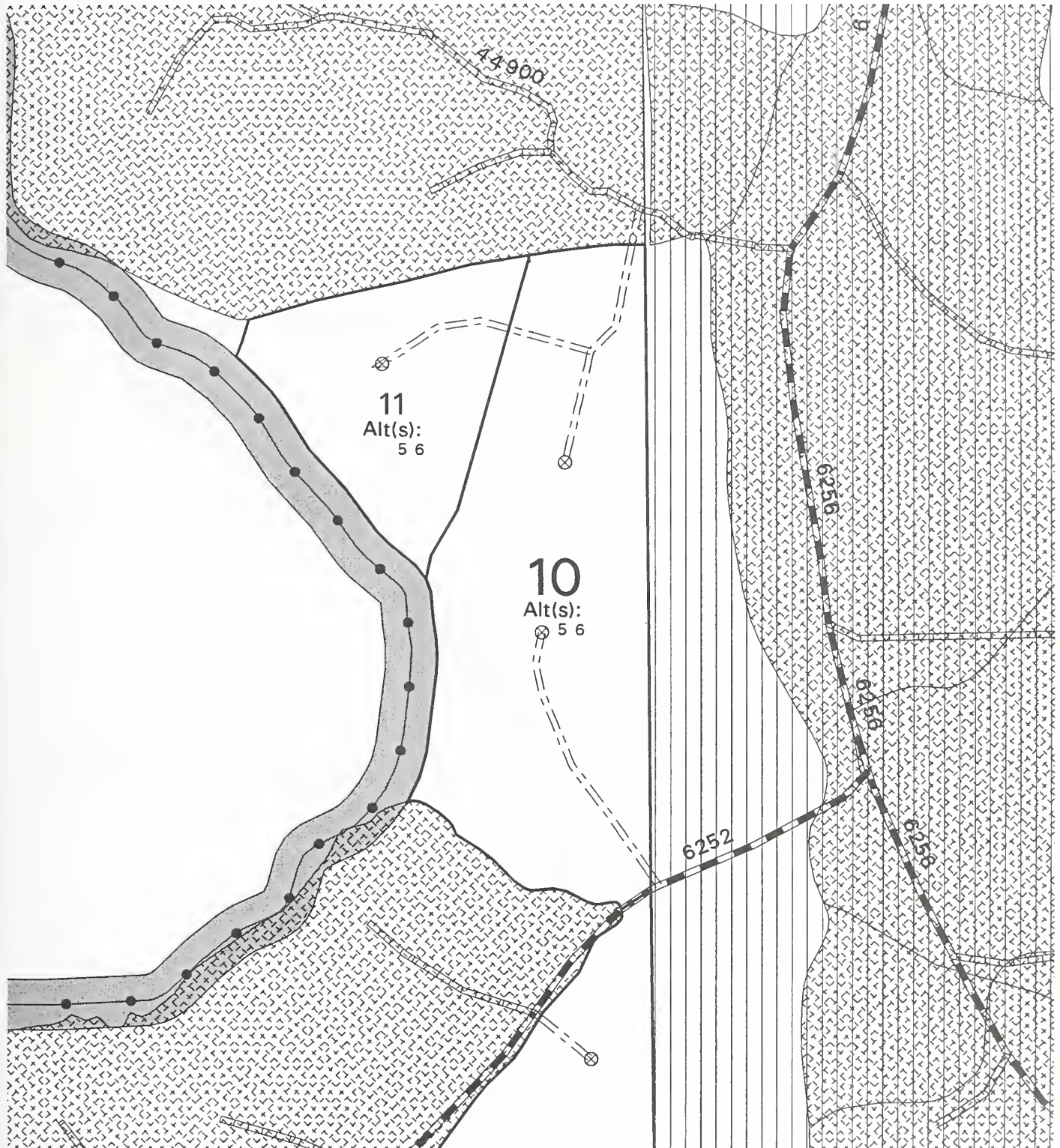
**Silvicultural Prescription**

Single-tree Selection - 20% removal

**Logging System and Unit Design**

The north and south boundary is bordered by managed stands; the west boundary follows a Class I stream and a common boundary with Unit 11. The east boundary follows non-National Forest Lands. Two spurs are required to minimize shovel yarding distances.

# Crystal Creek Timber Harvest Unit 10



Alternatives that include the proposed units are listed beneath the larger unit numbers.

- |  |                          |  |                                   |
|--|--------------------------|--|-----------------------------------|
|  | Proposed Unit Boundaries |  | AHMU-Class II Streams             |
|  | Non-NF Lands             |  | AHMU-Class III Streams            |
|  | Existing Managed Stands  |  | AHMU-Class IV Streams             |
|  | TTRA Buffers             |  | Lakes and Major Rivers            |
|  | Riparian Management Area |  | Existing Forest Development Roads |
|  | Lake Buffers             |  | Existing Closed Roads             |
|  | Waterfowl Buffers        |  | Proposed Forest Development Roads |
|  | AHMU-Class I Streams     |  | Proposed Temporary Roads          |

- |  |                          |
|--|--------------------------|
|  | Landings                 |
|  | 500-ft. Contour Interval |
|  | 100-ft. Contour Interval |



Scale is 1 inch = 660 feet



**Crystal Creek Unit Card**  
**Unit 11**

Acres: 24      Alternative (s): 5 and 6      MBF Volume: 110      MCF Volume : 29  
1977 Aerial Photo: Flight #: 50      Photo #: 8

**Resource Concerns and Mitigation**

**Wildlife**

Concern: Goose nesting likely to occur within or adjacent to the unit.

Mitigation: Use single-tree selection harvest method. Prohibit tree falling, yarding, and road construction within the unit during the period of April 1 to July 31.

**Fisheries**

Concern: Class I stream to the west of the unit.

Mitigation: Maintain a 100 foot no-cut commercial timber harvest buffer and a no programmed commercial timber harvest area to the greatest extent of the flood plain, riparian vegetation, or soils, or riparian associated wetland fens.

**Silvicultural Prescription**

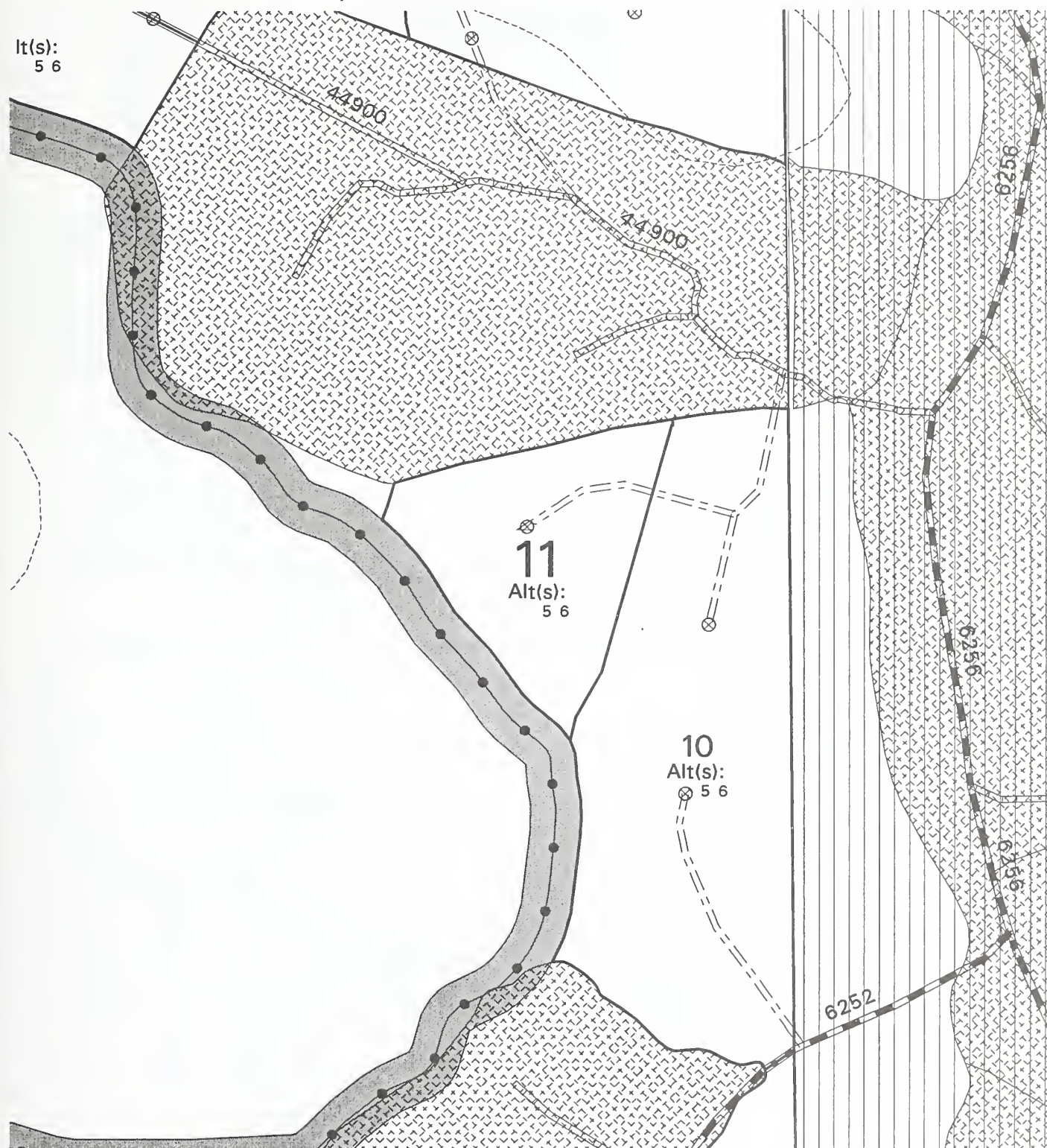
Single-tree Selection - 20% removal

**Logging System and Unit Design**

The unit boundary follows a managed stand to the north; shares a common boundary with unit 10 to the east and follows a Class I stream buffer to the west. A short spur is necessary to minimize shovel yarding distance.



# Crystal Creek Timber Harvest Unit 11



Alternatives that include the proposed units are listed beneath the larger unit numbers.

- |  |                          |  |                                   |
|--|--------------------------|--|-----------------------------------|
|  | Proposed Unit Boundaries |  | AHMU-Class II Streams             |
|  | Non-NF Lands             |  | AHMU-Class III Streams            |
|  | Existing Managed Stands  |  | AHMU-Class IV Streams             |
|  | TTRA Buffers             |  | Lakes and Major Rivers            |
|  | Riparian Management Area |  | Existing Forest Development Roads |
|  | Lake Buffers             |  | Existing Closed Roads             |
|  | Waterfowl Buffers        |  | Proposed Forest Development Roads |
|  | AHMU-Class I Streams     |  | Proposed Temporary Roads          |

- |  |                          |
|--|--------------------------|
|  | Landings                 |
|  | 500-ft. Contour Interval |
|  | 100-ft. Contour Interval |

0 660 1320

Scale is 1 inch = 660 feet



**Crystal Creek Unit Card**  
**Unit 12**

Acres: 14      Alternative (s): 2, 3, 5 and 6      MBF Volume: 125      MCF Volume : 32  
1977 Aerial Photo: Flight #: 49      Photo #: 155

**Resource Concerns and Mitigation**

**Fisheries**

Concern: Small Class I stream to the south of the unit.

Mitigation: Maintain a 100 foot no-cut commercial timber harvest buffer and a no programmed commercial timber harvest area to the greatest extent of the flood plain, riparian vegetation, or soils, or riparian associated wetland fens.

**Silvicultural Prescription**

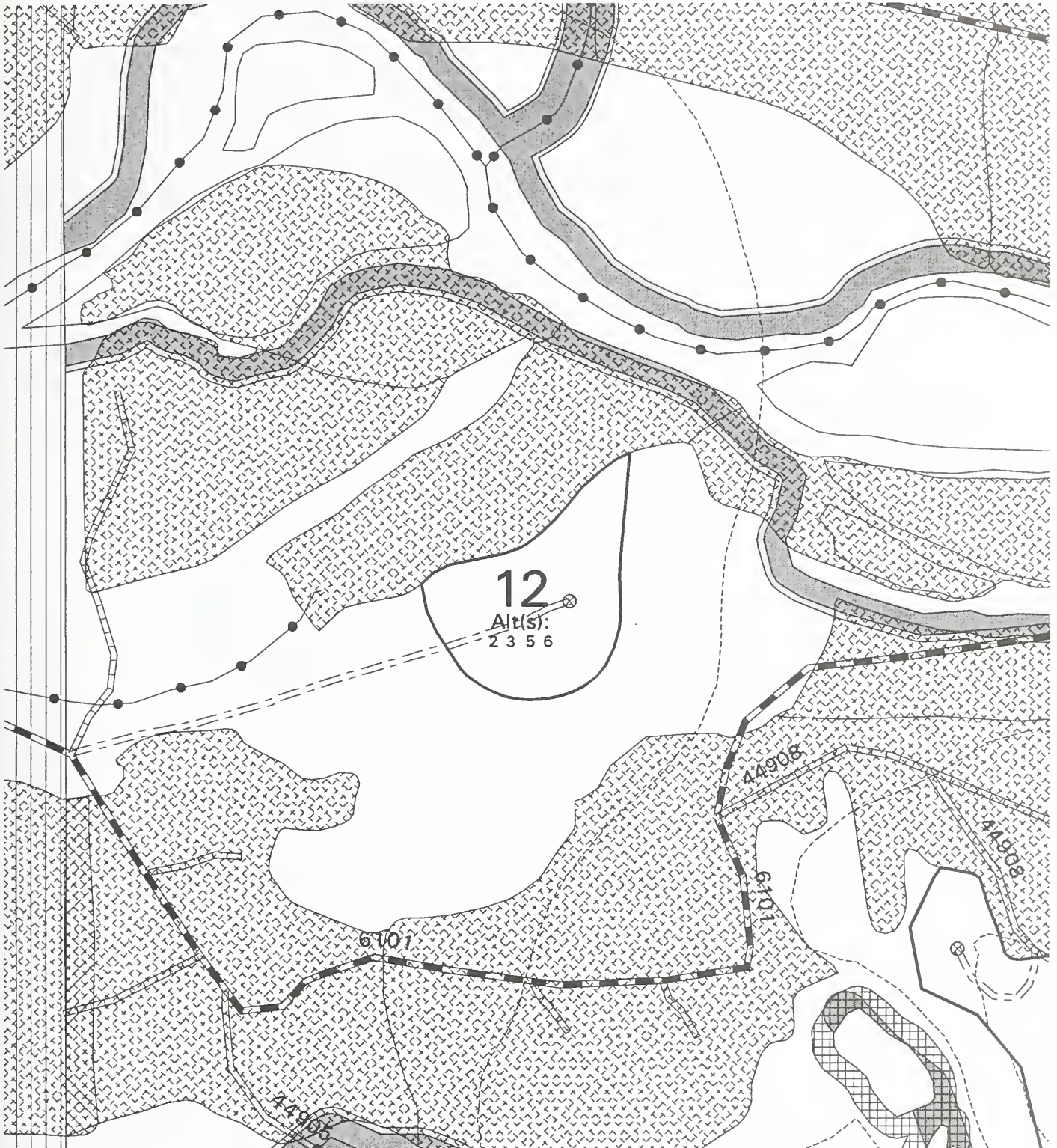
Single-tree Selection - 20% removal

**Logging System and Unit Design**

The unit boundary follows a managed stand to the north and topographic features (uplifted river terrace) on the east, west, and south boundaries. Shovel logging is the preferred yarding method.

Part of the stand will be used as a unlogged control for a study on the deer and moose use where single-tree selection has occurred.

# Crystal Creek Timber Harvest Unit 12



Alternatives that include the proposed units are listed beneath the larger unit numbers.

- |  |                          |  |                                   |
|--|--------------------------|--|-----------------------------------|
|  | Proposed Unit Boundaries |  | AHMU-Class II Streams             |
|  | Non-NF Lands             |  | AHMU-Class III Streams            |
|  | Existing Managed Stands  |  | AHMU-Class IV Streams             |
|  | TTRA Buffers             |  | Lakes and Major Rivers            |
|  | Riparian Management Area |  | Existing Forest Development Roads |
|  | Lake Buffers             |  | Existing Closed Roads             |
|  | Waterfowl Buffers        |  | Proposed Forest Development Roads |
|  | AHMU-Class I Streams     |  | Proposed Temporary Roads          |

- |  |                          |
|--|--------------------------|
|  | Landings                 |
|  | 500-ft. Contour Interval |
|  | 100-ft. Contour Interval |



Scale is 1 inch = 660 feet



**Crystal Creek Unit Card**  
**Unit 13**

Acres: 27      Alternative (s): 3 and 5      MBF Volume: 227, 302      MCF Volume : 59, 79  
1977 Aerial Photo: Flight #: 53      Photo #: 96

**Resource Concerns and Mitigation**

**Scenery**

Concern: Upper portion of unit visible from Thomas Bay and Frederick Sound.

Mitigation: Designed as a partial harvest. Use group selection harvest method to minimize harvest openings at the north and northeast end of unit beyond the ridge line to less than 1 acre.

**Landslide Prone Soils**

Concern: Approximately 5 acres of isolated areas of steep slopes are located in the south-central portion of the unit (west facing backslope, separated by a bench).

Mitigation: Retain some trees in this area to maintain slope stability.

**Hydrology**

Concern: Small class IV stream located in the southwest portion of unit.

Mitigation: Maintain partial log suspension when yarding over stream to maintain channel stability.

**Silvicultural Prescription**

Group Selection - 30% removal (Alternative 3)

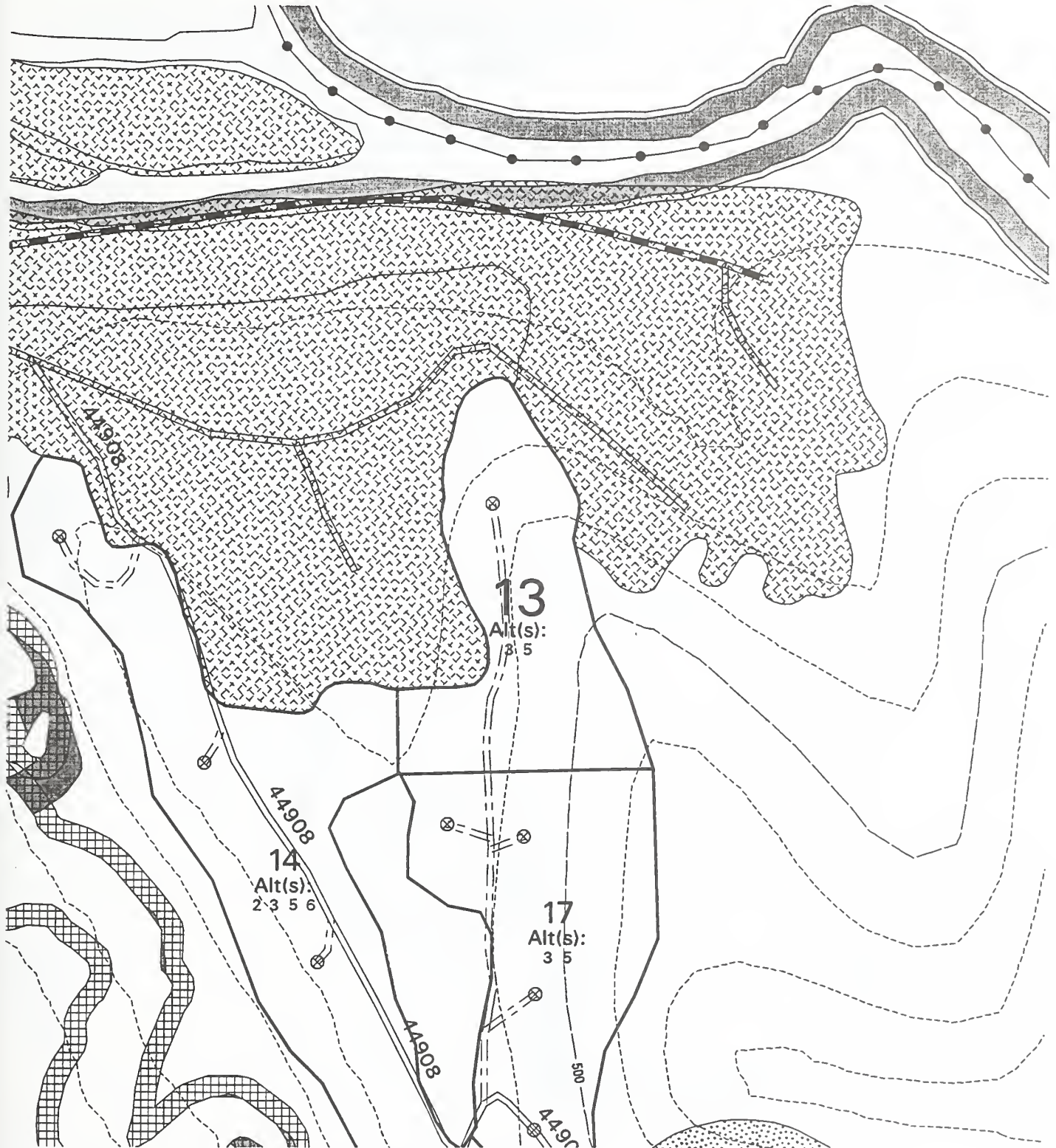
Group Selection - 40% removal (Alternative 5)

**Logging System and Unit Design**

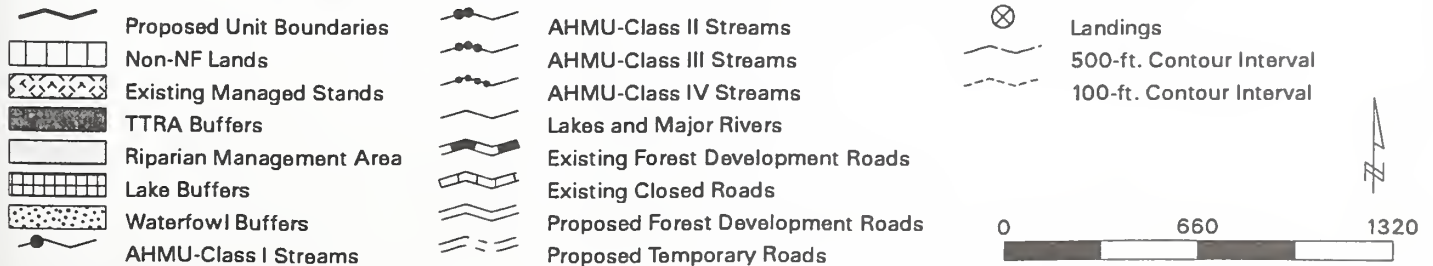
The unit boundary follows slope breaks along managed stands and contour breaks along the west and east boundaries. Short spur is required. Cable logging will be the primary logging system with shovel logging next to the road.



# Crystal Creek Timber Harvest Unit 13



Alternatives that include the proposed units are listed beneath the larger unit numbers.





**Crystal Creek Unit Card**  
**Unit 14**

Acres: 54 Alternative (s): 2, 3, 5, 6    MBF Volume: 445, 445, 594, 445    MCF Volume : 114, 114, 153, 114  
1977 Aerial Photo: Flight #: 53    Photo #: 96

**Resource Concerns and Mitigation**

**Wildlife**

Concern: Goose nesting likely within or adjacent to the southern portion of the unit.

Mitigation: Use group selection harvest method. Prohibit tree falling and yarding in southern 20% of the unit during the period of April 1 to July 31.

**Silvicultural Prescription**

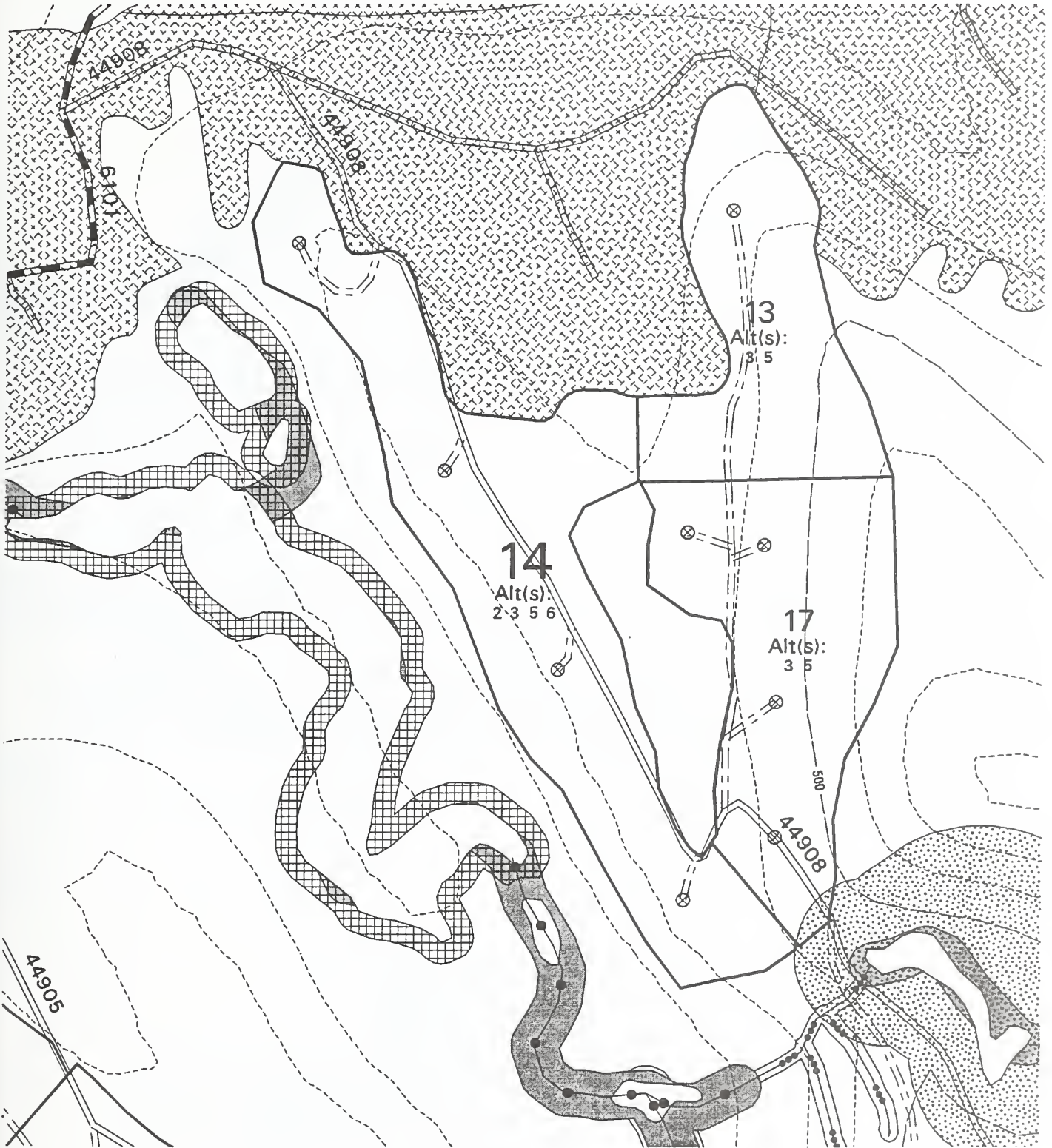
Group Selection - 30% removal (Alternative 2, 3, and 6)

Group Selection - 40% removal (Alternative 5)

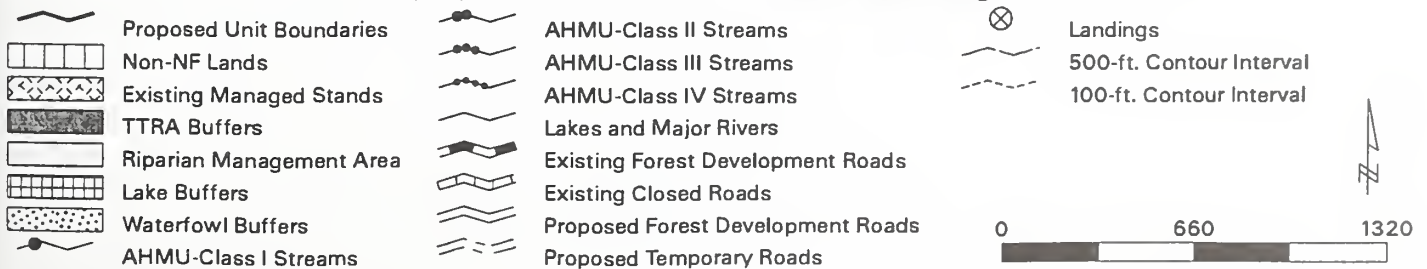
**Logging System and Unit Design**

The west side of the unit follows a slope break. The north boundary follows a managed stand, and the west boundary follows a small chain of muskegs. The unit is planned for cable systems with areas that could be shovel logged.

# Crystal Creek Timber Harvest Unit 14



Alternatives that include the proposed units are listed beneath the larger unit numbers.



**Crystal Creek Unit Card**  
**Unit 15**

Acres: 83      Alternative (s): 2, 5, and 6      MBF Volume: 696      MCF Volume : 243  
1977 Aerial Photo: Flight #: 50      Photo #: 8

## **Resource Concerns and Mitigation**

### **Wildlife**

Concern: Goose nesting likely within or adjacent to the unit.

Mitigation: Use single-tree selection harvest method. Prohibit tree falling and yarding in southern half of the unit during the period of April 1 to July 31. Restrict harvest within waterfowl buffer to single-tree selection with 40% maximum removal of basal area this entry.

## **Silvicultural Prescription**

Single-tree Selection - 0%, 20%, 40%, and 60% removal

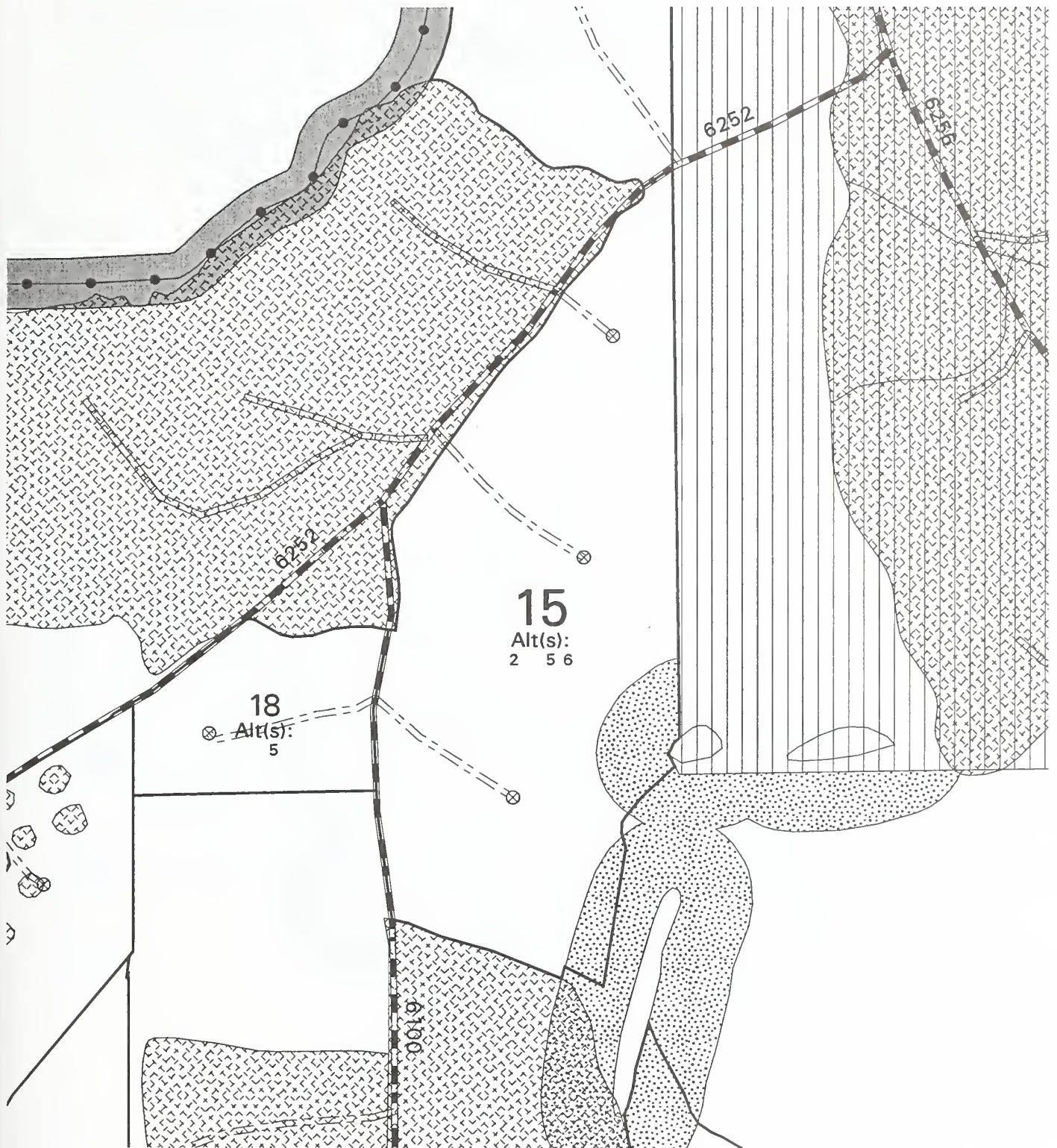
## **Logging System and Unit Design**

The unit boundary follows managed stands and specified roads. Shovel logging will be used which will minimize soil disturbance.

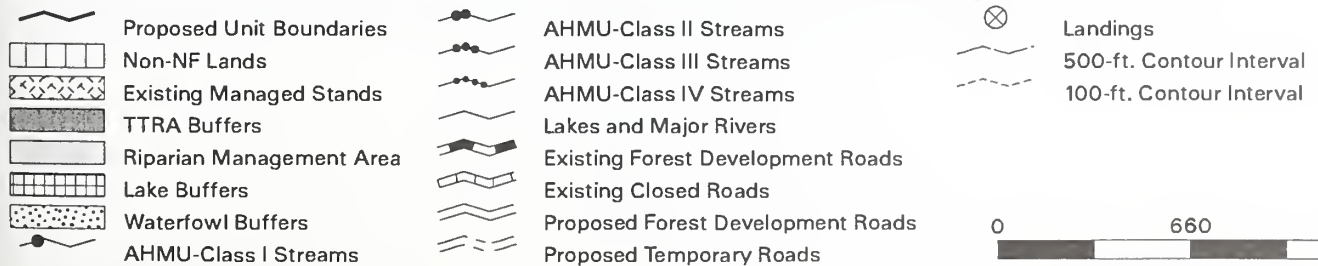
This unit will be used as a study area to determine deer and moose use where various levels of harvest has occurred. The control area where no timber harvest will be conducted should avoid portions of the unit along road 6100 and/or 6252 where trees have been previously harvested (generally close to the roads). The waterfowl buffer will have a maximum removal of 40% of basal area.



# Crystal Creek Timber Harvest Unit 15



Alternatives that include the proposed units are listed beneath the larger unit numbers.



Scale is 1 inch = 660 feet



## Crystal Creek Unit Card

### Unit 17

Acres: 35      Alternative (s): 3 and 5      MBF Volume: 284, 378      MCF Volume: 74, 98  
1977 Aerial Photo: Flight #: 53      Photo #: 96

## **Resource Concerns and Mitigation**

### Wetlands

Concern: Wetlands within the unit.

Mitigation: Wetter sites within the unit will be avoided where practicable and skid trails will be identified. Where possible, trees will be felled away from these sites to avoid filling with logging slash.

### Wildlife

Concern: Goose nesting likely within or adjacent to unit.

Mitigation: Prohibit tree falling and yarding in the southern one-third of the unit during the period of April 1 to July 31. Prohibit road construction on Road 44908 in Unit 17 and in waterfowl buffer south of the unit during the period of April 1 to June 30. Avoid harvest in the waterfowl buffer, except for road right-of-way clearing for this entry.

### Scenery

Concern: Upper portion of unit visible from Thomas Bay and Frederick Sound.

Mitigation: Unit as designed addresses scenic concern.

### Landslide Prone Soils

Concern: Isolated areas of steep slope located in southeastern portion of harvest unit usually in conjunction with rock outcroppings.

Mitigation: Retain some trees on steeper slopes to maintain slope stability.

## **Silvicultural Prescription**

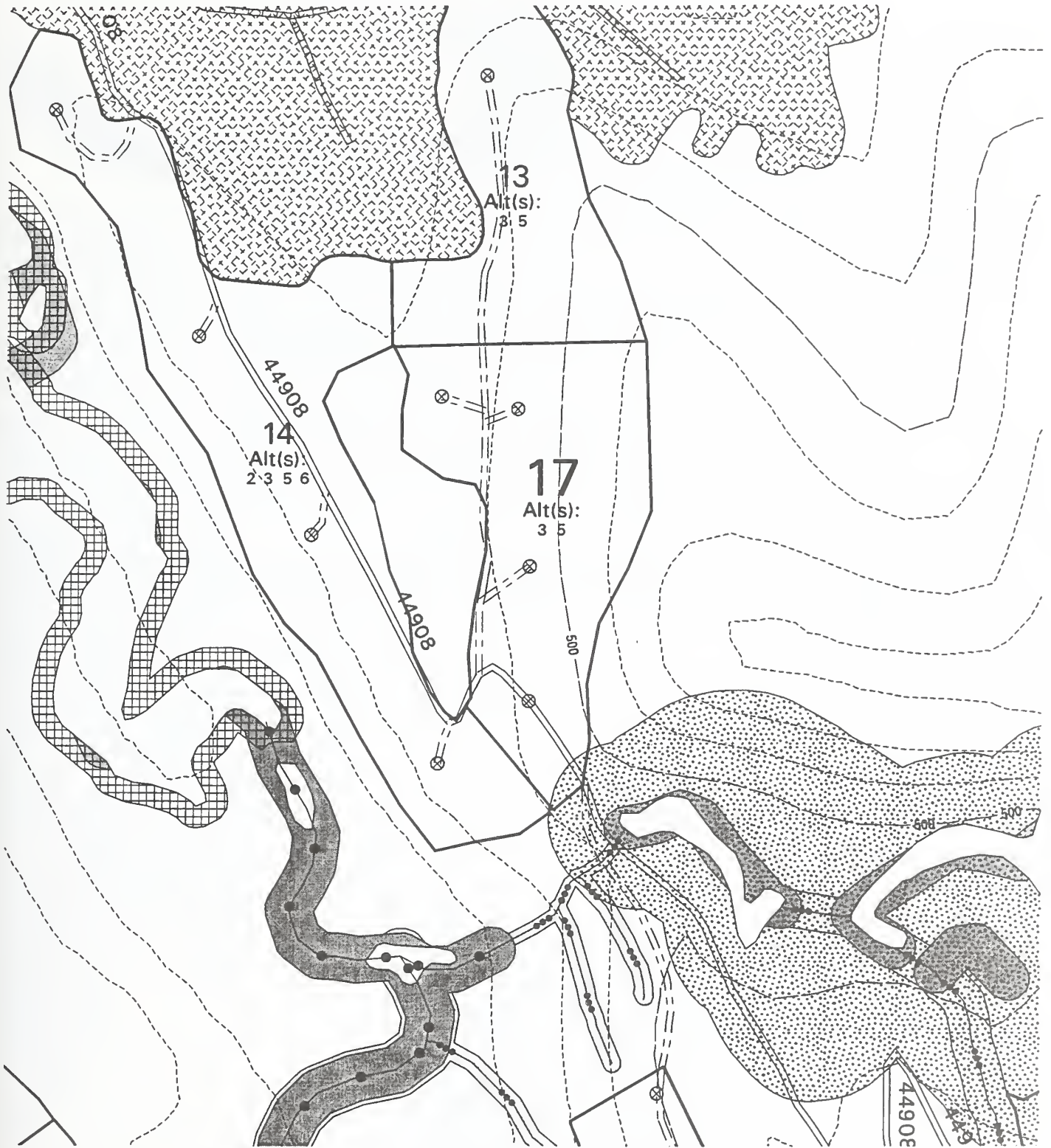
Group Selection - 30% removal (Alternative 3)

Group Selection - 40% removal (Alternative 5)

## **Logging System and Unit Design**

The unit boundary follows slope contours. Short stub temporary road will be needed to minimize cable yarding distance; some shovel yarding is possible.

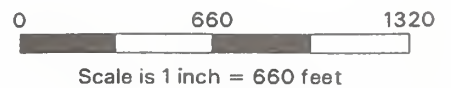
# Crystal Creek Timber Harvest Unit 17



Alternatives that include the proposed units are listed beneath the larger unit numbers.

- |  |                          |  |                                   |
|--|--------------------------|--|-----------------------------------|
|  | Proposed Unit Boundaries |  | AHMU-Class II Streams             |
|  | Non-NF Lands             |  | AHMU-Class III Streams            |
|  | Existing Managed Stands  |  | AHMU-Class IV Streams             |
|  | TTRA Buffers             |  | Lakes and Major Rivers            |
|  | Riparian Management Area |  | Existing Forest Development Roads |
|  | Lake Buffers             |  | Existing Closed Roads             |
|  | Waterfowl Buffers        |  | Proposed Forest Development Roads |
|  | AHMU-Class I Streams     |  | Proposed Temporary Roads          |

- |  |                          |
|--|--------------------------|
|  | Landings                 |
|  | 500-ft. Contour Interval |
|  | 100-ft. Contour Interval |



**Crystal Creek Unit Card**  
**Unit 18**

Acres: 18      Alternative (s): 5  
1977 Aerial Photo: Flight #: 49

MBF Volume: 419  
Photo #: 154

MCF Volume : 107

## **Resource Concerns and Mitigation**

### **Recreation**

Concern: Unit will be visible from road to Point Agassiz (6252).

Mitigation: Use reserve tree patches along Road 6252 to minimize visibility of unit.

## **Silvicultural Prescription**

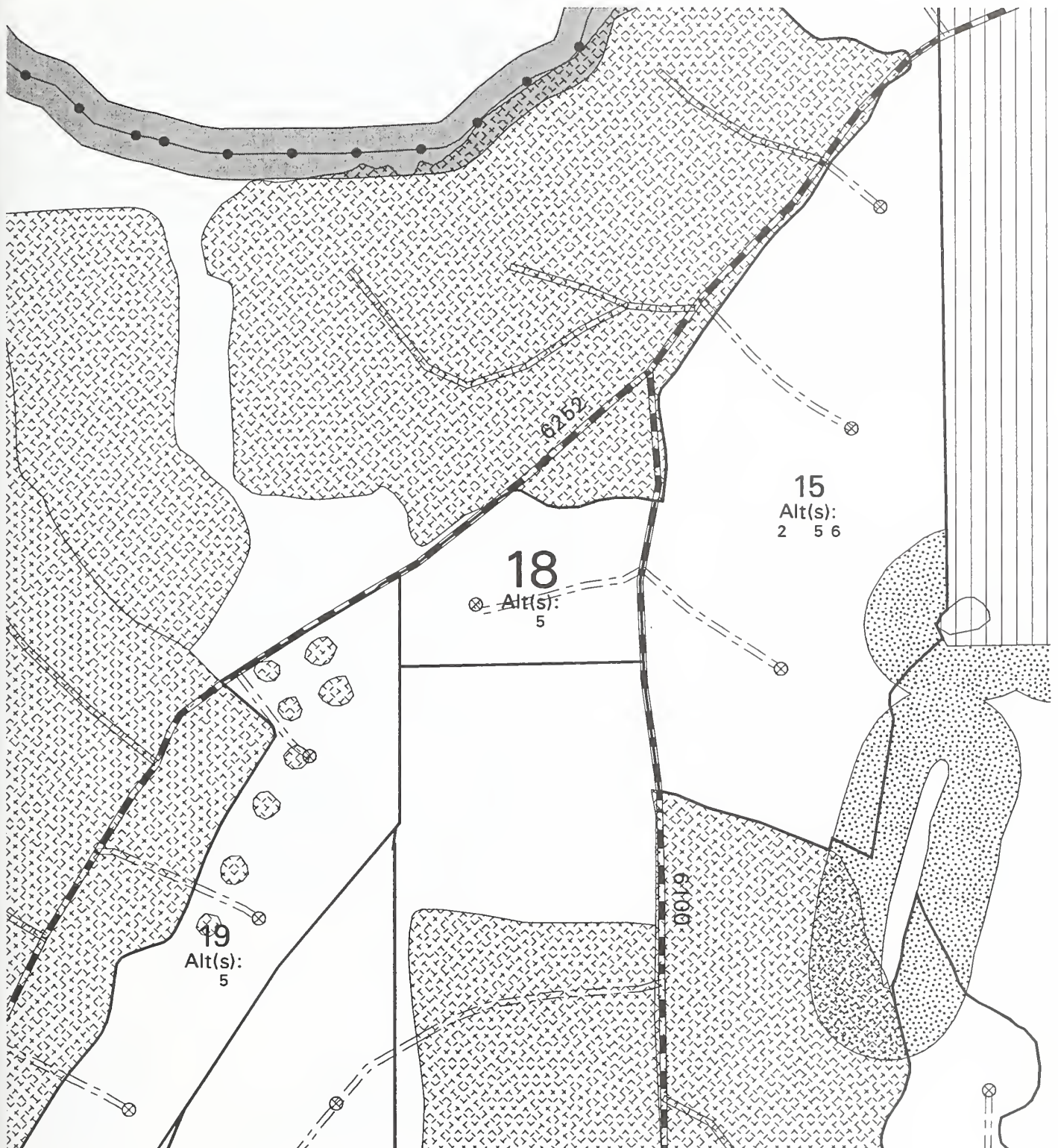
Clearcut with reserves. Look for opportunities to retain more than 15% of the basal area by leaving unmerchantable or large trees with low-economic value.

## **Logging System and Unit Design**

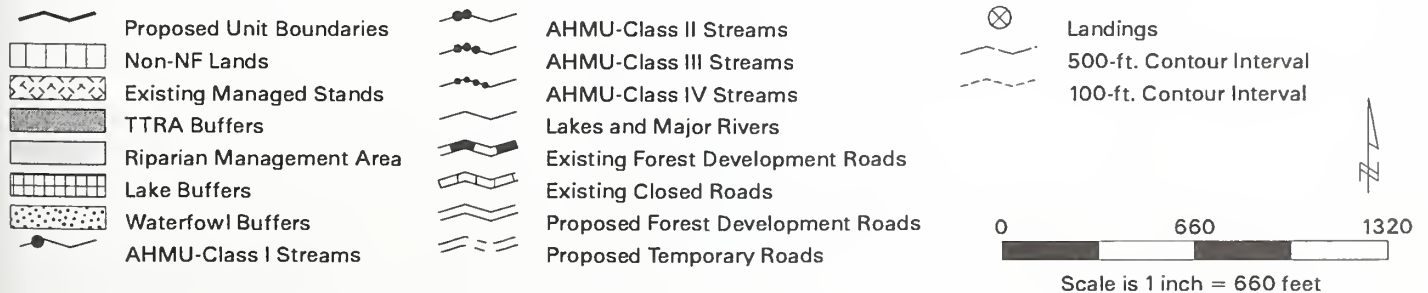
Shovel logging on flat ground will provide for minimal impact during timber harvest. The unit boundary follows specified roads and managed stands. The control block of a previous partial harvest study will be the southern boundary.



# Crystal Creek Timber Harvest Unit 18



Alternatives that include the proposed units are listed beneath the larger unit numbers.





## **Crystal Creek Unit Card**

### **Unit 19**

Acres: 48      Alternative (s): 5  
1977 Aerial Photo: Flight #: 49

MBF Volume: 409  
Photo #: 154

MCF Volume : 104

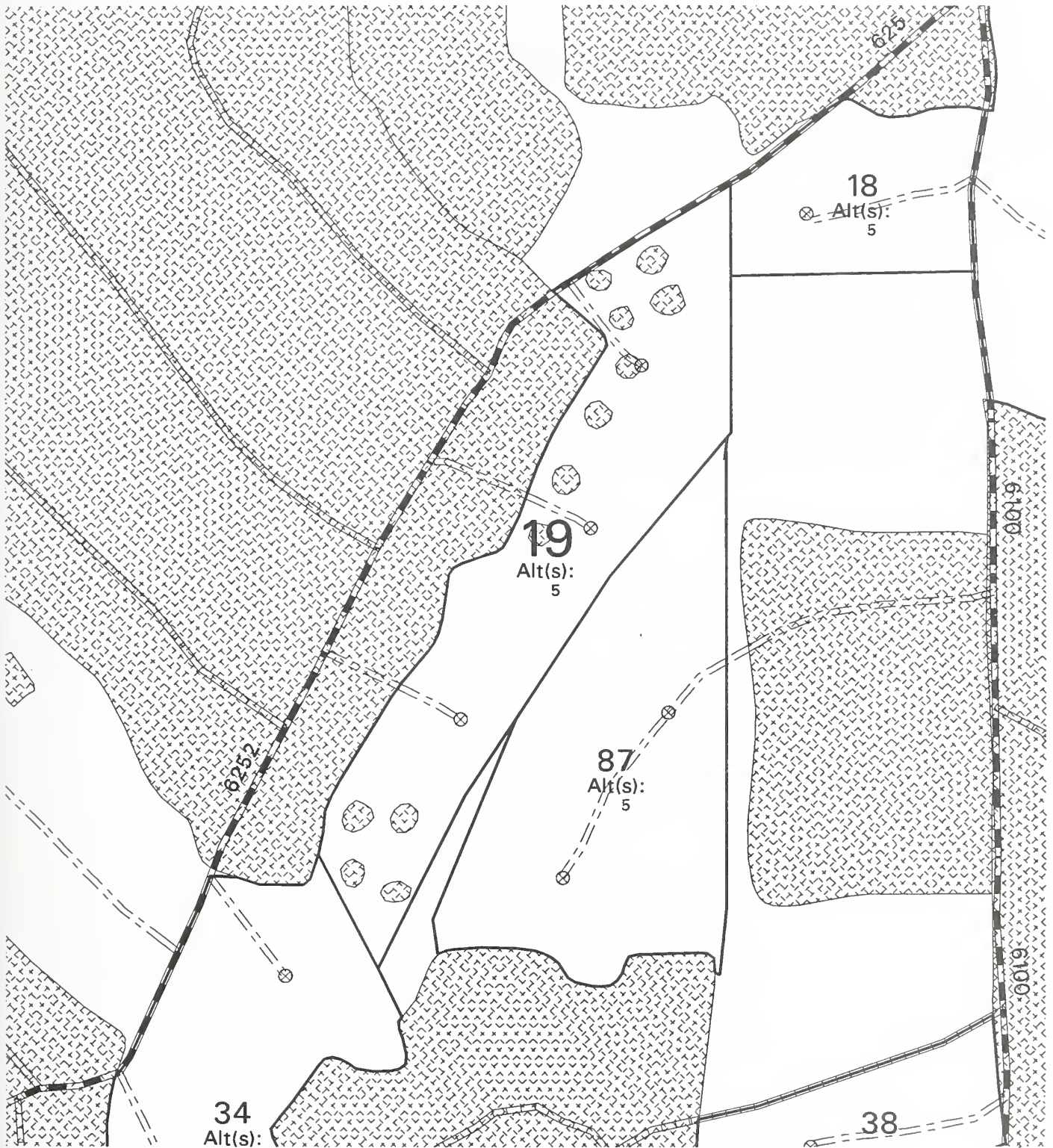
### **Silvicultural Prescription**

Group Selection - 30% removal

### **Logging System and Unit Design**

Unit follows managed stands and a muskeg/grass opening on the east side of boundary. Short spur roads will be needed for access.

# Crystal Creek Timber Harvest Unit 19



Alternatives that include the proposed units are listed beneath the larger unit numbers.



**Crystal Creek Unit Card**  
**Unit 21**

Acres: 37      Alternative (s): 2, 3, and 6      MBF Volume: 643      MCF Volume: 181  
1977 Aerial Photo: Flight #: 52      Photo #: 64

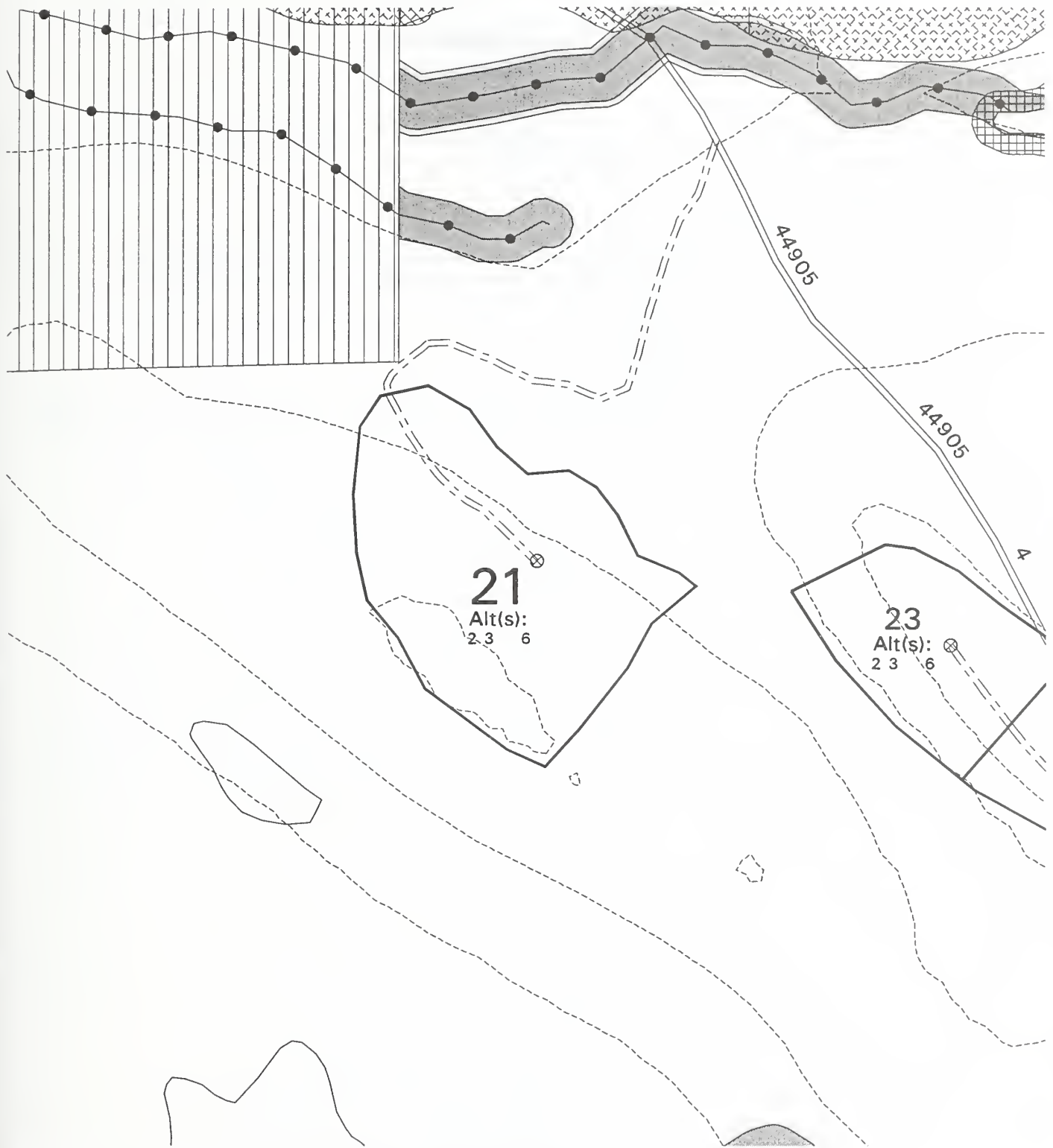
**Silvicultural Prescription**

Clearcut with reserves. Look for opportunities to retain more than 15% of the basal area by leaving unmerchantable or large trees with low-economic value.

**Logging System and Unit Design**

The north and east boundary follows a muskeg fringe. The west boundary follows a slope break to the north. This unit will use a combination of shovel yarding to the north and cable yarding from the landing. A temporary road is required and needs to be located so that impact on wet areas is minimized.

# Crystal Creek Timber Harvest Unit 21



Alternatives that include the proposed units are listed beneath the larger unit numbers.

- |  |                          |  |                                   |
|--|--------------------------|--|-----------------------------------|
|  | Proposed Unit Boundaries |  | AHMU-Class II Streams             |
|  | Non-NF Lands             |  | AHMU-Class III Streams            |
|  | Existing Managed Stands  |  | AHMU-Class IV Streams             |
|  | TTRA Buffers             |  | Lakes and Major Rivers            |
|  | Riparian Management Area |  | Existing Forest Development Roads |
|  | Lake Buffers             |  | Existing Closed Roads             |
|  | Waterfowl Buffers        |  | Proposed Forest Development Roads |
|  | AHMU-Class I Streams     |  | Proposed Temporary Roads          |

- |  |                          |
|--|--------------------------|
|  | Landings                 |
|  | 500-ft. Contour Interval |
|  | 100-ft. Contour Interval |



Scale is 1 inch = 660 feet





**Crystal Creek Unit Card**  
**Unit 22**

Acres: 34      Alternative (s): 5  
1977 Aerial Photo: Flight #: 49

MBF Volume: 838  
Photo #: 154

MCF Volume: 214

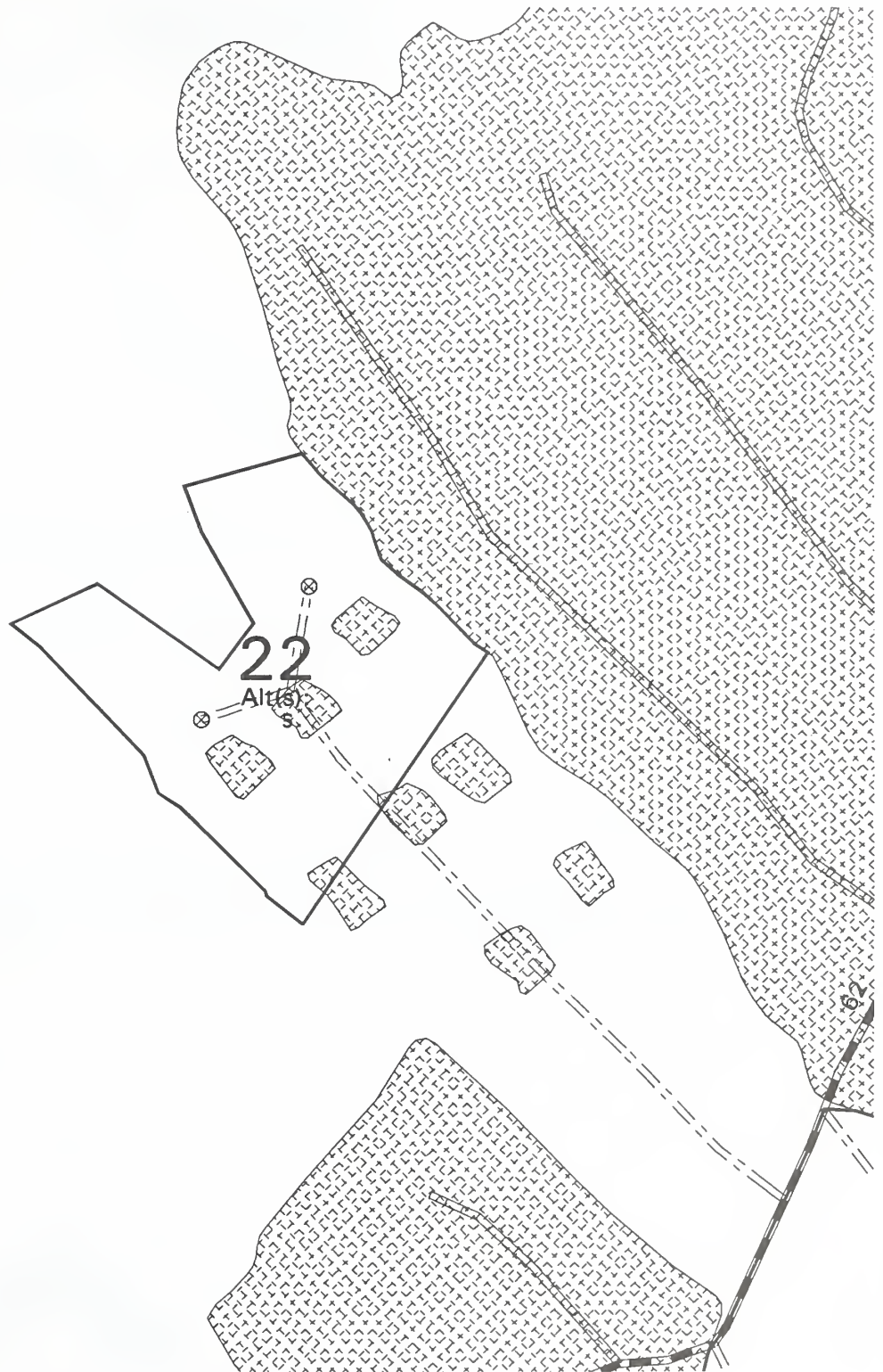
**Silvicultural Prescription**

Clearcut with reserves. Look for opportunities to retain more than 15% of the basal area by leaving unmerchantable or large trees with low-economic value. Some recent patch cuts are within the unit, avoid disturbance of regeneration.

**Logging System and Unit Design**

The north and west boundary follows muskeg and low-volume timber. The east boundary follows a managed stand. The unit is flat; shovel yarding will be used.

# Crystal Creek Timber Harvest Unit 22



Alternatives that include the proposed units are listed beneath the larger unit numbers.

- |  |                          |  |                                   |
|--|--------------------------|--|-----------------------------------|
|  | Proposed Unit Boundaries |  | AHMU-Class II Streams             |
|  | Non-NF Lands             |  | AHMU-Class III Streams            |
|  | Existing Managed Stands  |  | AHMU-Class IV Streams             |
|  | TTRA Buffers             |  | Lakes and Major Rivers            |
|  | Riparian Management Area |  | Existing Forest Development Roads |
|  | Lake Buffers             |  | Existing Closed Roads             |
|  | Waterfowl Buffers        |  | Proposed Forest Development Roads |
|  | AHMU-Class I Streams     |  | Proposed Temporary Roads          |

- |  |                          |
|--|--------------------------|
|  | Landings                 |
|  | 500-ft. Contour Interval |
|  | 100-ft. Contour Interval |



Scale is 1 inch = 660 feet



**Crystal Creek Unit Card**  
**Unit 23**

Acres: 17      Alternative (s): 2, 3, and 6 MBF Volume: 120, 340, 40 MCF Volume : 32, 90, 11  
1977 Aerial Photo: Flight #: 52      Photo #: 64

## **Resource Concerns and Mitigation**

### **Scenery**

Concern: Portion of unit are visible from Frederick Sound.

Mitigation: Unit as designed addresses scenic concern.

### **Landslide Prone Soils**

Concern: Isolated areas of steep slope located in the south-central portion of the unit usually in association with rock outcroppings and cliffs.

Mitigation: Retain some trees on steeper slopes to maintain slope stability.

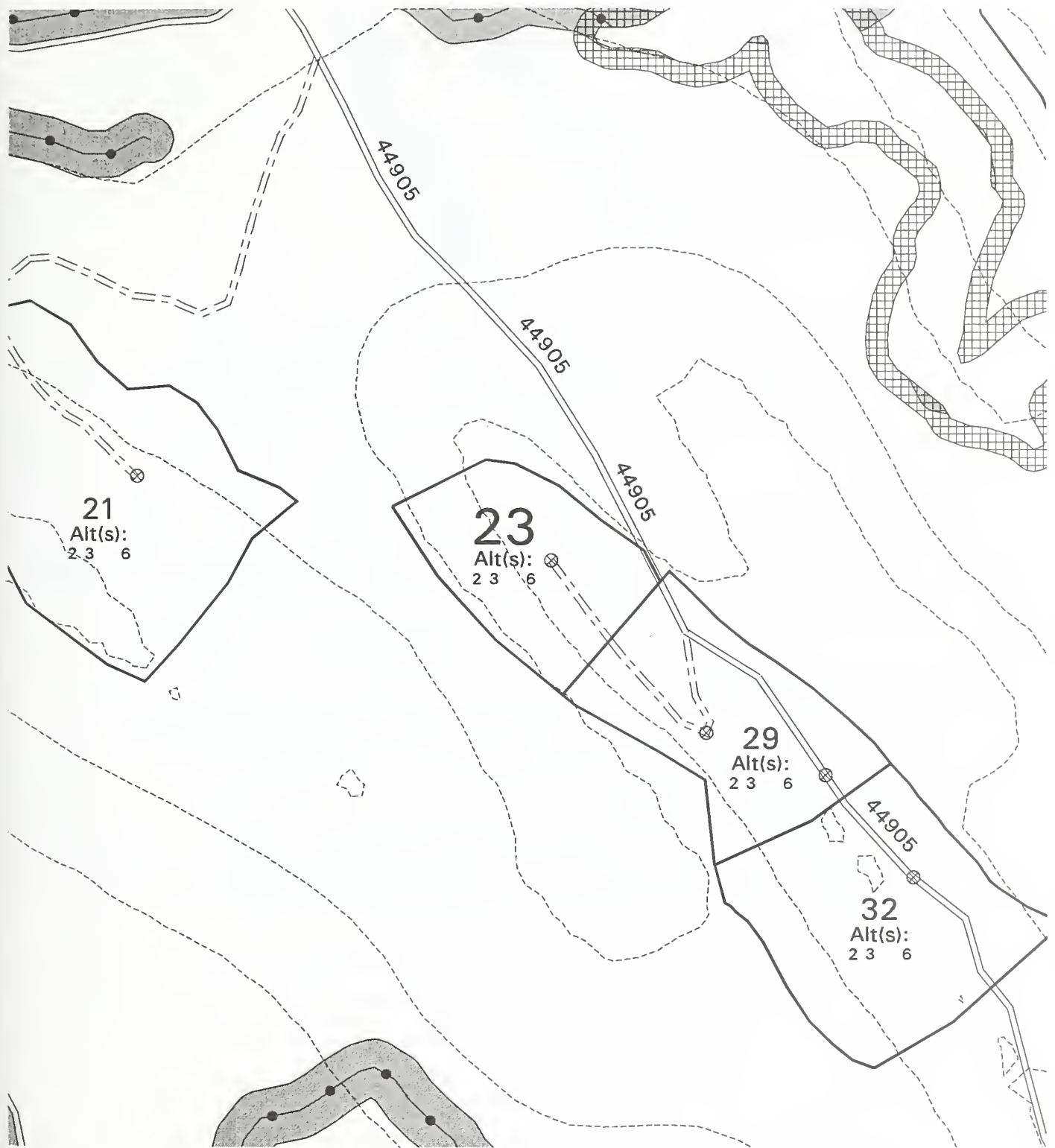
## **Silvicultural Prescription**

Group Selection - 30% removal (Alternatives 2 and 6)  
Clearcut with reserves (Alternative 3)

## **Logging System and Unit Design**

The west and north boundary follows muskeg and low volume timber to the Specified road. A short temporary road is needed to minimize cable yarding distance. The unit needs to be designed to avoid Maybeso soils on the northern edge of the unit.

# Crystal Creek Timber Harvest Unit 23



Alternatives that include the proposed units are listed beneath the larger unit numbers.

- |  |                          |  |                                   |
|--|--------------------------|--|-----------------------------------|
|  | Proposed Unit Boundaries |  | AHMU-Class II Streams             |
|  | Non-NF Lands             |  | AHMU-Class III Streams            |
|  | Existing Managed Stands  |  | AHMU-Class IV Streams             |
|  | TTRA Buffers             |  | Lakes and Major Rivers            |
|  | Riparian Management Area |  | Existing Forest Development Roads |
|  | Lake Buffers             |  | Existing Closed Roads             |
|  | Waterfowl Buffers        |  | Proposed Forest Development Roads |
|  | AHMU-Class I Streams     |  | Proposed Temporary Roads          |

- |  |                          |
|--|--------------------------|
|  | Landings                 |
|  | 500-ft. Contour Interval |
|  | 100-ft. Contour Interval |

0 660 1320

Scale is 1 inch = 660 feet



## **Crystal Creek Unit Card**

### **Unit 24**

Acres: 25, 45 Alternative (s): 2, 5, and 6 MBF Volume: 616, 1115 MCF Volume :157, 272  
1977 Aerial Photo: Flight #: 53 Photo #: 96

## **Resource Concerns and Mitigation**

### **Wildlife**

Concern: Old-Growth Connectivity between medium and large habitat conservation areas.

Mitigation: Maintain forest between units 24 and 25 in an old-growth condition. Restrict right of way clearing along road between units to create as narrow an opening as is feasible. Monitor to insure the temporary road between the units is closed after harvest.

### **Hydrology**

Concern: High Contained Class III stream channel to the east of the unit.

Mitigation: No programmed commercial timber harvest within the Riparian Management Area, defined as the V-notch (side slope break). Directional fall trees away from notch and yard away from the stream. Maintain a windfirm buffer within the notch.

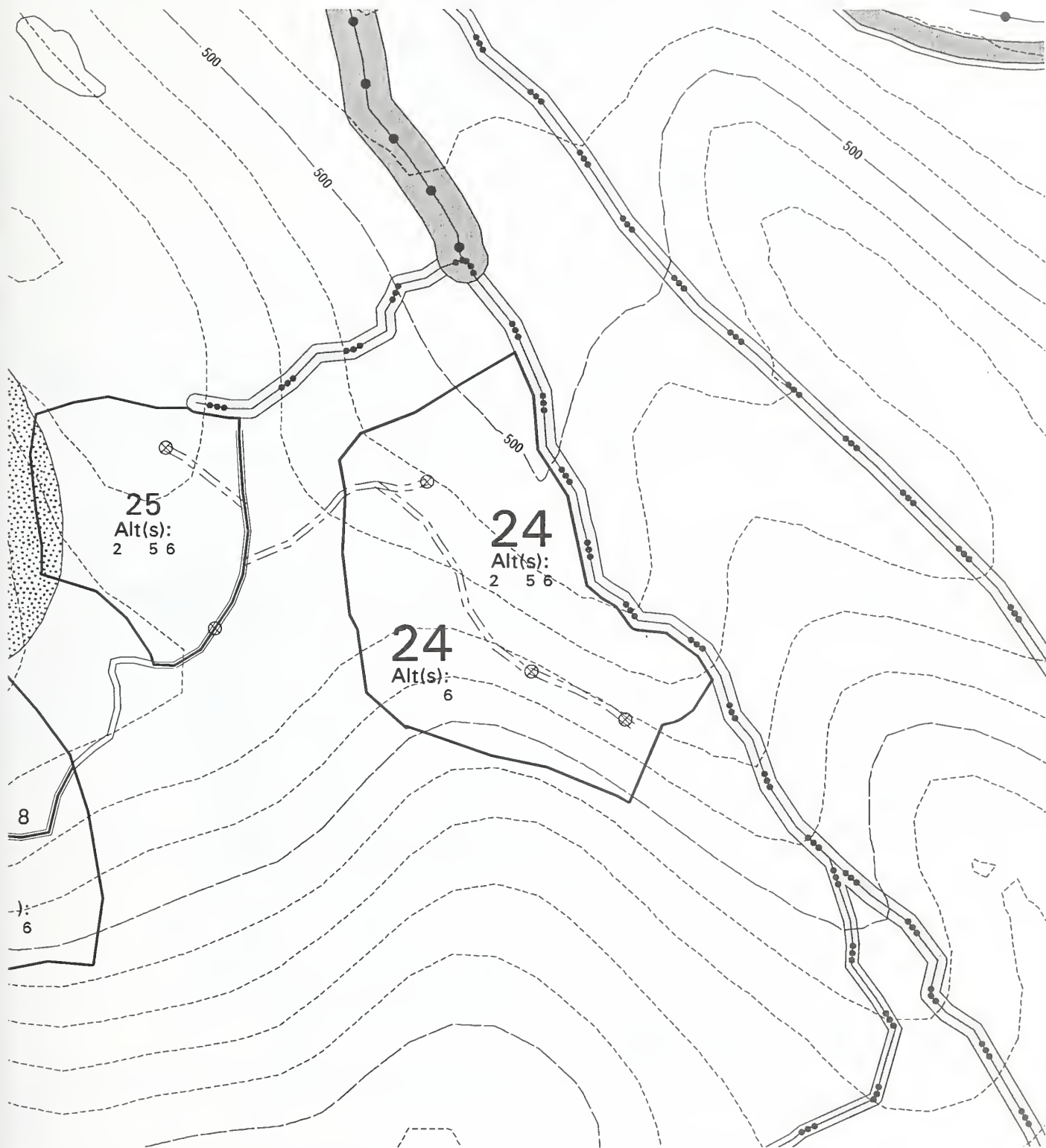
## **Silvicultural Prescription**

Clearcut with reserves. Look for opportunities to retain more than 15% of the basal area by leaving unmerchantable or large trees with low-economic value.

## **Logging System and Unit Design**

Most of the unit boundary follows ridge breaks; the northeast boundary is a Class III stream. A short temporary road is required to minimize cable yarding distances. This unit has two different designs. For Alternatives 2 and 5, Road 44908 is the southwest boundary. The unit design for Alternative 6 is on both sides of the road.

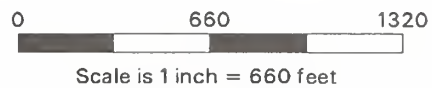
# Crystal Creek Timber Harvest Unit 24



Alternatives that include the proposed units are listed beneath the larger unit numbers.

- |  |                          |  |                                   |
|--|--------------------------|--|-----------------------------------|
|  | Proposed Unit Boundaries |  | AHMU-Class II Streams             |
|  | Non-NF Lands             |  | AHMU-Class III Streams            |
|  | Existing Managed Stands  |  | AHMU-Class IV Streams             |
|  | TTRA Buffers             |  | Lakes and Major Rivers            |
|  | Riparian Management Area |  | Existing Forest Development Roads |
|  | Lake Buffers             |  | Existing Closed Roads             |
|  | Waterfowl Buffers        |  | Proposed Forest Development Roads |
|  | AHMU-Class I Streams     |  | Proposed Temporary Roads          |

- |  |                          |
|--|--------------------------|
|  | Landings                 |
|  | 500-ft. Contour Interval |
|  | 100-ft. Contour Interval |



## Crystal Creek Unit Card

### Unit 25

Acres: 22      Alternative (s): 2, 5, and 6      MBF Volume: 428      MCF Volume : 118  
1977 Aerial Photo: Flight #: 53      Photo #: 96

## **Resource Concerns and Mitigation**

### Wildlife

Concerns: Goose nesting likely within or adjacent to the unit and Old-Growth Connectivity between medium and large habitat conservation areas.

Mitigation Measures: Prohibit tree falling and yarding in the unit during the period of April 1 to July 31. Restrict harvest within waterfowl buffer to 40% maximum removal of basal area this entry. Retain at least three large dead and dying trees per acre where feasible. Maintain forest between units 24 and 25 in an old-growth condition. Restrict right-of-way clearing along road between units to create as narrow an opening as is feasible. Monitor to insure the temporary road between the units is closed after harvest.

### Hydrology

Concern: High Contained Class III stream channel to the northeast of the Unit.

Mitigation: No programmed commercial timber harvest within the Riparian Management Area, as defined as the V-notch (side-slope break). Directional fall trees away from the notch.

### Scenery

Concern: Portion of unit visible from Thomas Bay.

Mitigation: Unit as designed addresses scenic concern.

### Landslide Prone Soils

Concern: Isolated areas of steep slope greater than 70% slope along the southwest and northern boundaries.

Mitigation: Unit as designed avoids these slopes.

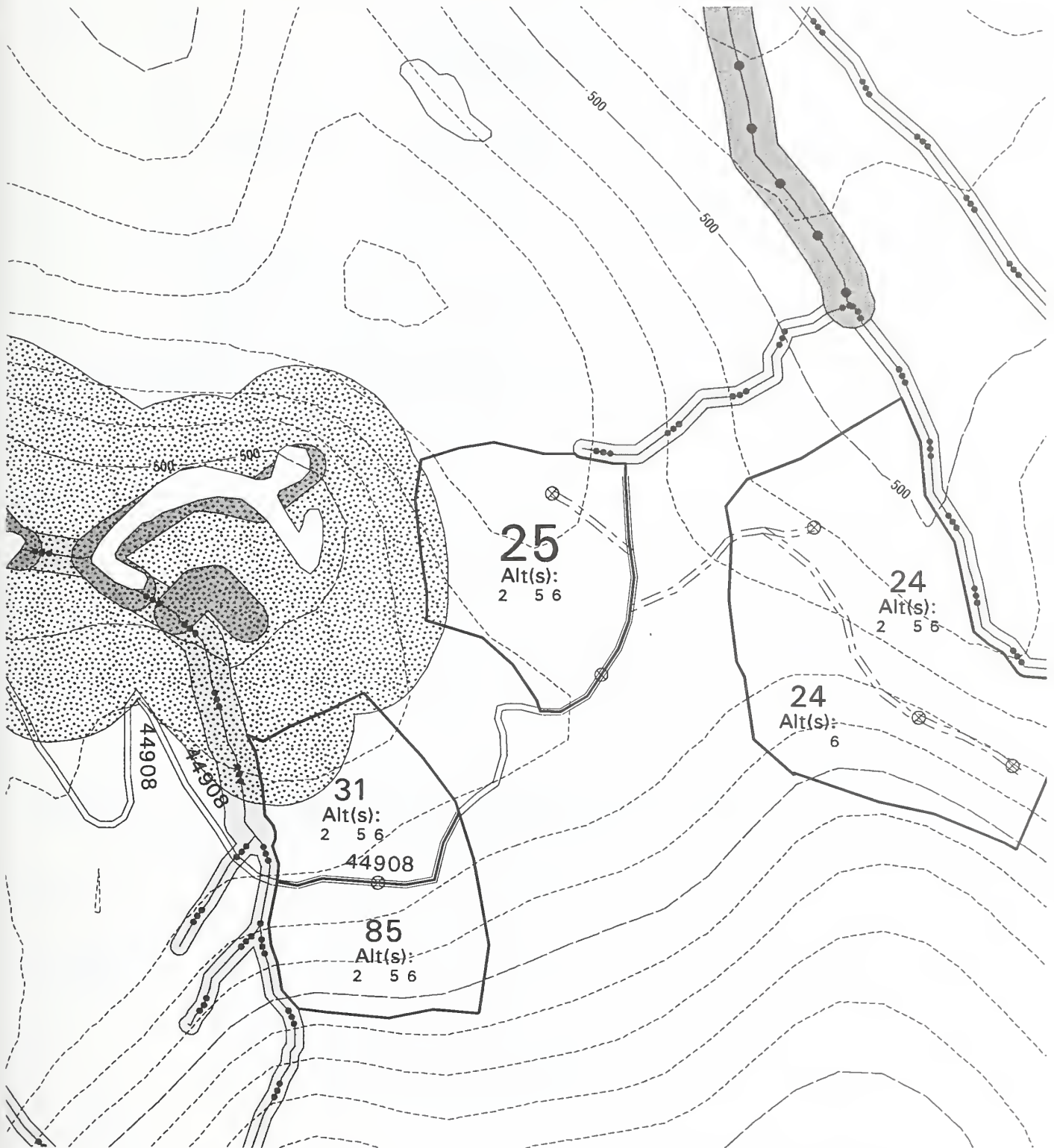
## **Silvicultural Prescription**

Clearcut with Reserves. Restrict harvest to 40% removal within the waterfowl buffer.

## **Logging System and Unit Design**

The unit follows slope breaks. A short temporary road is needed to minimize cable yarding distance to minimize soil disturbance.

# Crystal Creek Timber Harvest Unit 25



Alternatives that include the proposed units are listed beneath the larger unit numbers.

- |  |                          |  |                                   |
|--|--------------------------|--|-----------------------------------|
|  | Proposed Unit Boundaries |  | AHMU-Class II Streams             |
|  | Non-NF Lands             |  | AHMU-Class III Streams            |
|  | Existing Managed Stands  |  | AHMU-Class IV Streams             |
|  | TTRA Buffers             |  | Lakes and Major Rivers            |
|  | Riparian Management Area |  | Existing Forest Development Roads |
|  | Lake Buffers             |  | Existing Closed Roads             |
|  | Waterfowl Buffers        |  | Proposed Forest Development Roads |
|  | AHMU-Class I Streams     |  | Proposed Temporary Roads          |

- |  |                          |
|--|--------------------------|
|  | Landings                 |
|  | 500-ft. Contour Interval |
|  | 100-ft. Contour Interval |



Scale is 1 inch = 660 feet



**Crystal Creek Unit Card**  
**Unit 26**

Acres: 24      Alternative (s): 2, 5, and 6      MBF Volume: 490      MCF Volume : 135  
1977 Aerial Photo: Flight #: 50      Photo #: 8

## **Resource Concerns and Mitigation**

### **Wildlife**

Concern: Goose nesting likely within or adjacent to the unit.

Mitigation: Prohibit tree falling and yarding in unit during the period of April 1 to July 31. Restrict harvest within waterfowl buffer to 40% maximum removal of basal area this entry. Top one large-diameter tree for every three acres in clearcut portion of the unit for future goose nest platforms and retain at least three large dead and dying trees/acre where feasible.

### **Wetlands**

Concern: Forest wetland, Maybeso series soils, along eastern border.

Mitigation: Unit is designed to avoid these soils, field verify during unit layout.

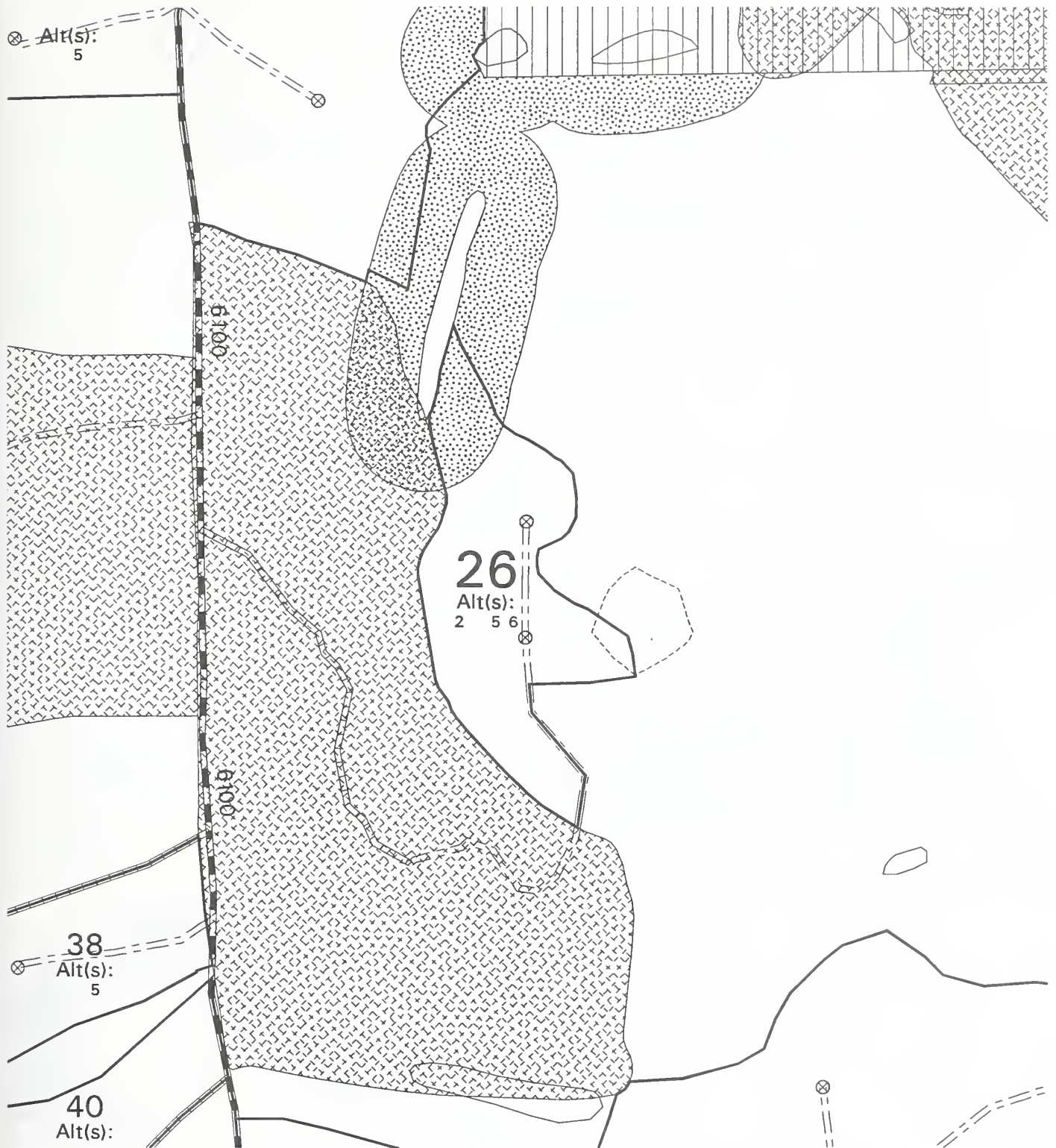
## **Silvicultural Prescription**

Clearcut with reserves. Restrict harvest to 40% removal of basal area within the waterfowl buffer. Look for opportunities to retain more than 15% of the basal area by leaving unmerchantable or large trees with low-economic value.

## **Logging System and Unit Design**

The unit boundary follows managed stands. The east boundary follows muskeg fringe and low volume timber. Part of the unit was dropped due to forested wetland soil. A short temporary road is required to minimize shovel yarding distances.

# Crystal Creek Timber Harvest Unit 26



Alternatives that include the proposed units are listed beneath the larger unit numbers.

- |  |                          |  |                                   |
|--|--------------------------|--|-----------------------------------|
|  | Proposed Unit Boundaries |  | AHMU-Class II Streams             |
|  | Non-NF Lands             |  | AHMU-Class III Streams            |
|  | Existing Managed Stands  |  | AHMU-Class IV Streams             |
|  | TTRA Buffers             |  | Lakes and Major Rivers            |
|  | Riparian Management Area |  | Existing Forest Development Roads |
|  | Lake Buffers             |  | Existing Closed Roads             |
|  | Waterfowl Buffers        |  | Proposed Forest Development Roads |
|  | AHMU-Class I Streams     |  | Proposed Temporary Roads          |

- |  |                          |
|--|--------------------------|
|  | Landings                 |
|  | 500-ft. Contour Interval |
|  | 100-ft. Contour Interval |

0 660 1320

Scale is 1 inch = 660 feet

## **Crystal Creek Unit Card**

### **Unit 29**

Acres: 21 Alternative (s): 2, 3, 6 MBF Volume: 459, 162, 459 MCF Volume: 119, 42, 119  
1977 Aerial Photo: Flight #: 52 Photo #: 64

## **Resource Concerns and Mitigation**

### **Scenery**

Concern: Portion of unit visible from Frederick Sound and Thomas Bay.

Mitigation: Unit as designed addresses scenic concern.

### **Landslide Prone Soils**

Concern: Isolated areas of steep slope located in the west-central portion of unit at base of cliff and rock outcropping.

Mitigation: Retain some trees on steeper slopes to maintain slope stability.

## **Silvicultural Prescription**

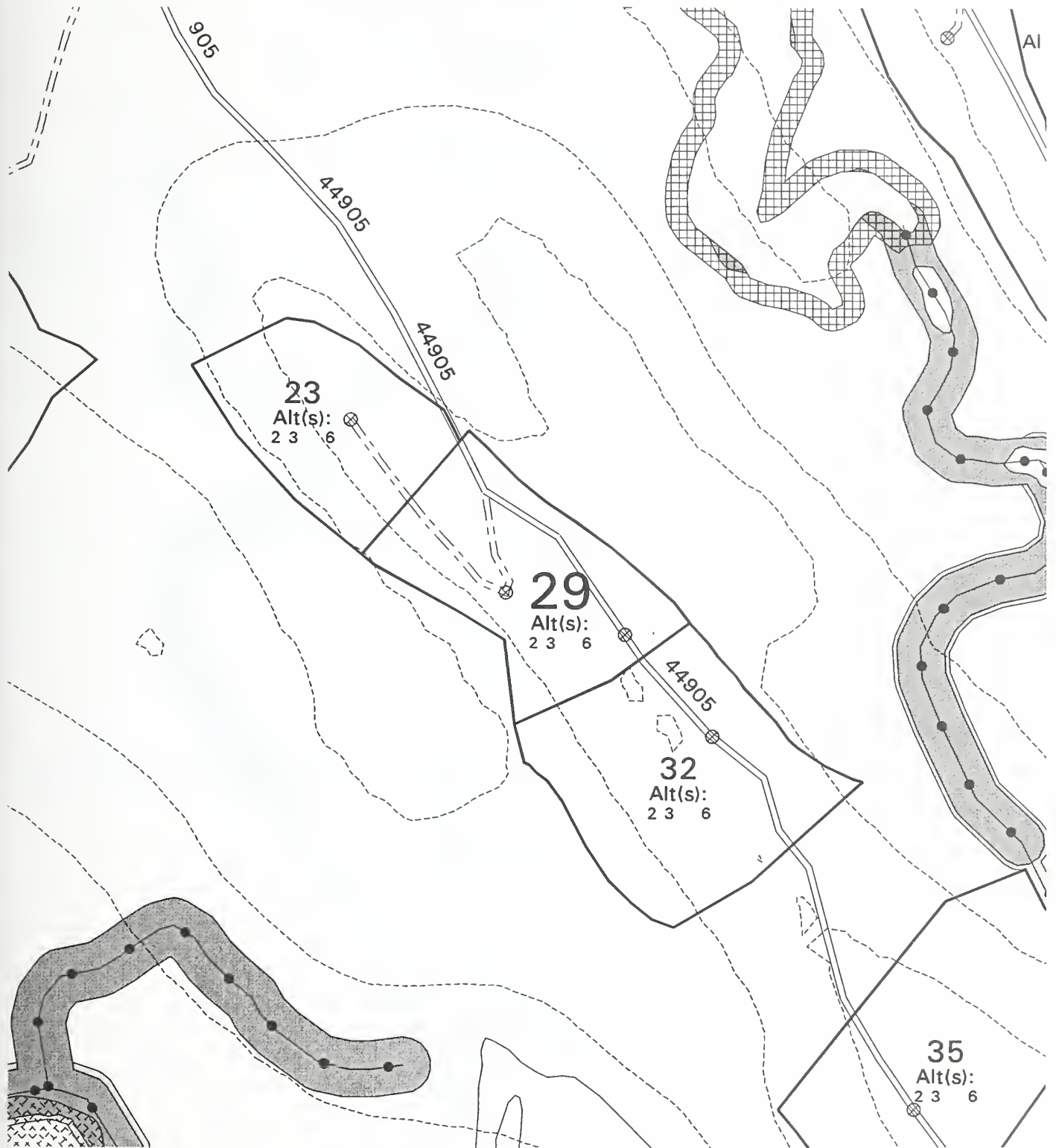
Clearcut with reserves: Look for opportunities to retain more than 15% of the basal area by leaving unmerchantable or large trees with low-economic value. (Alternative 2 and 6)

Group Selection - 30% removal (Alternative 3)

## **Logging System and Unit Design**

The west boundary follows muskeg edge and slope break. The east boundary follows the slope contour. A combination of cable and shovel yarding are the planned harvest systems.

# Crystal Creek Timber Harvest Unit 29



Alternatives that include the proposed units are listed beneath the larger unit numbers.

- |  |                          |  |                                   |
|--|--------------------------|--|-----------------------------------|
|  | Proposed Unit Boundaries |  | AHMU-Class II Streams             |
|  | Non-NF Lands             |  | AHMU-Class III Streams            |
|  | Existing Managed Stands  |  | AHMU-Class IV Streams             |
|  | TTRA Buffers             |  | Lakes and Major Rivers            |
|  | Riparian Management Area |  | Existing Forest Development Roads |
|  | Lake Buffers             |  | Existing Closed Roads             |
|  | Waterfowl Buffers        |  | Proposed Forest Development Roads |
|  | AHMU-Class I Streams     |  | Proposed Temporary Roads          |

- |  |                          |
|--|--------------------------|
|  | Landings                 |
|  | 500-ft. Contour Interval |
|  | 100-ft. Contour Interval |

0 660 1320

Scale is 1 inch = 660 feet



## Crystal Creek Unit Card

### Unit 30

Acres: 7      Alternative (s): 2, 5, and 6      MBF Volume: 162      MCF Volume : 42  
1977 Aerial Photo: Flight #: 52      Photo #: 64

## **Resource Concerns and Mitigation**

### Wildlife

Concern: Goose nesting likely within or adjacent to the unit.

Mitigation: Prohibit tree falling and yarding in the unit during the period of April 1 to July 31. Retain at least three large dead and dying trees/acre where feasible.

### Hydrology

Concern: High Contained Class III stream channel southwest of the unit

Mitigation: No programmed commercial timber harvest within the Class III Riparian Management Area, defined as the V-notch (side-slope break). Directional fall trees away from the notch.

### Scenery

Concern: Portion of unit visible from Frederick Sound and Thomas Bay.

Mitigation: Unit as designed addresses scenic concern.

### Landslide Prone Soils

Concern: The eastern portion of the unit contains isolated areas of steep slope usually in association with cliffs and rock outcroppings.

Mitigation: The eastern portion of the unit has been dropped.

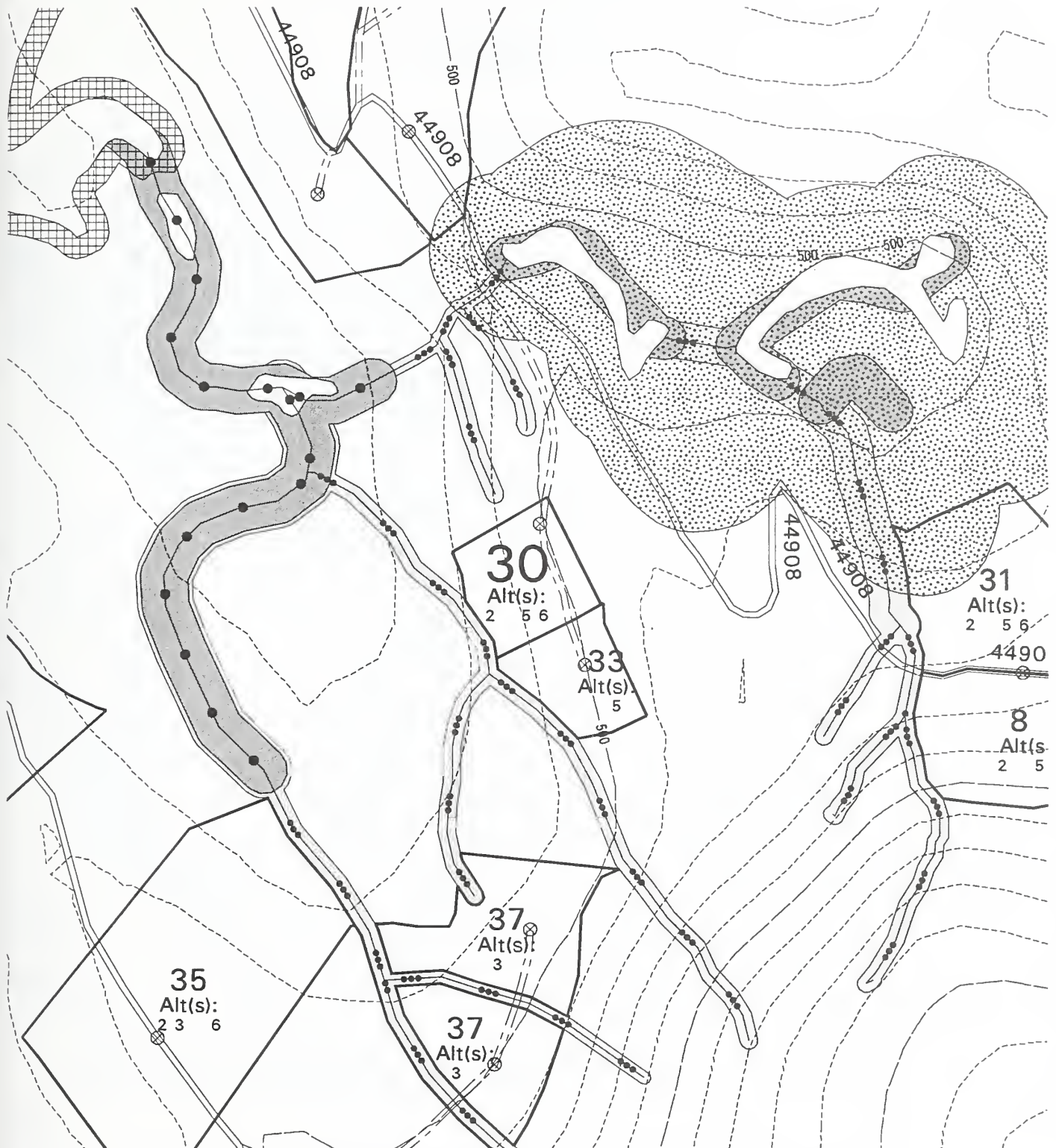
## **Silvicultural Prescription**

Clearcut with reserves.

## **Logging System and Unit Design**

The unit boundary follows slope breaks. The unit is planned for cable system.

# Crystal Creek Timber Harvest Unit 30



Alternatives that include the proposed units are listed beneath the larger unit numbers.

- |  |                          |  |                                   |
|--|--------------------------|--|-----------------------------------|
|  | Proposed Unit Boundaries |  | AHMu-Class II Streams             |
|  | Non-NF Lands             |  | AHMu-Class III Streams            |
|  | Existing Managed Stands  |  | AHMu-Class IV Streams             |
|  | TTRA Buffers             |  | Lakes and Major Rivers            |
|  | Riparian Management Area |  | Existing Forest Development Roads |
|  | Lake Buffers             |  | Existing Closed Roads             |
|  | Waterfowl Buffers        |  | Proposed Forest Development Roads |
|  | AHMu-Class I Streams     |  | Proposed Temporary Roads          |

- |  |                          |
|--|--------------------------|
|  | Landings                 |
|  | 500-ft. Contour Interval |
|  | 100-ft. Contour Interval |



Scale is 1 inch = 660 feet



## Crystal Creek Unit Card

### Unit 31

Acres: 14      Alternative (s): 2, 5, and 6      MBF Volume: 98 MCF Volume : 25  
1977 Aerial Photo: Flight #: 53      Photo #: 96

## **Resource Concerns and Mitigation**

### Wildlife

Concern: Goose nesting likely within or adjacent to the unit.

Mitigation: Prohibit tree falling and yarding in the unit during the period of April 1 to July 31. Restrict harvest within waterfowl buffer to 30% maximum removal of basal area this entry in alternatives 2 and 6. Restrict harvest within waterfowl buffer to 40% removal of basal area this entry in alternative 5.

### Hydrology

Concern: High Contained Class III stream channel southwest of the unit.

Mitigation: No Programmed commercial timber harvest within the Riparian Management Area, defined as the V-notch (side-slope break).

### Scenery

Concern: Portion of unit visible from Thomas Bay.

Mitigation: Unit as designed addresses scenic concern.

### Landslide Prone Soils

Concern: Isolated steep slopes in the northern and southern portion of unit along boundary.

Mitigation: Retain some trees on steeper slopes to maintain slope stability.

## **Silvicultural Prescription**

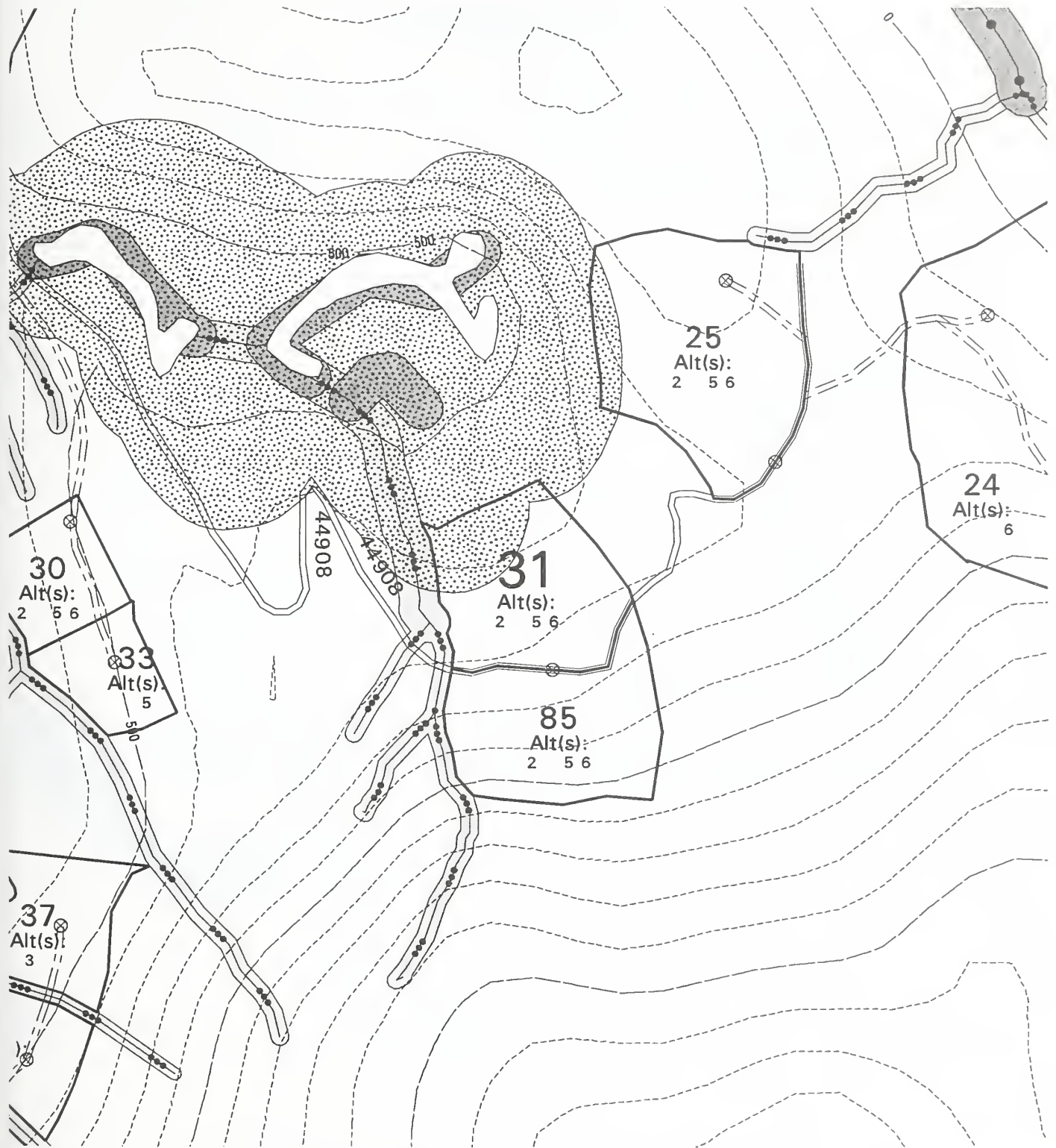
Group Selection - 30% removal (Alternatives 2 and 6)

Group Selection - 40% removal (Alternative 5)

## **Logging System and Unit Design**

The unit follows slope breaks along the north and east boundary. Muskeg and Class III streams provide the west boundary. The Road 44908 is the south boundary. Cable yarding from the road is the planned harvest system.

# Crystal Creek Timber Harvest Unit 31



Alternatives that include the proposed units are listed beneath the larger unit numbers.

- |  |                          |  |                                   |
|--|--------------------------|--|-----------------------------------|
|  | Proposed Unit Boundaries |  | AHMU-Class II Streams             |
|  | Non-NF Lands             |  | AHMU-Class III Streams            |
|  | Existing Managed Stands  |  | AHMU-Class IV Streams             |
|  | TTRA Buffers             |  | Lakes and Major Rivers            |
|  | Riparian Management Area |  | Existing Forest Development Roads |
|  | Lake Buffers             |  | Existing Closed Roads             |
|  | Waterfowl Buffers        |  | Proposed Forest Development Roads |
|  | AHMU-Class I Streams     |  | Proposed Temporary Roads          |

- Landings
- 500-ft. Contour Interval
- 100-ft. Contour Interval

0 660 1320

Scale is 1 inch = 660 feet



**Crystal Creek Unit Card**  
**Unit 32**

Acres: 27   Alternative (s): 2, 3, 6   MBF Volume: 226, 641, 641   MCF Volume : 57, 161, 161  
1977 Aerial Photo: Flight #: 52   Photo #: 64

**Resource Concerns and Mitigation**

**Scenery**

Concern: Portion of unit visible from Thomas Bay and Frederick Sound.

Mitigation: Unit as designed addresses scenic concern.

**Landslide Prone Soils**

Concern: Isolated areas of steep slope located in the northwest portion of harvest unit in association with cliffs and rock outcroppings.

Mitigation: Retain some trees on steeper slopes to maintain slope stability.

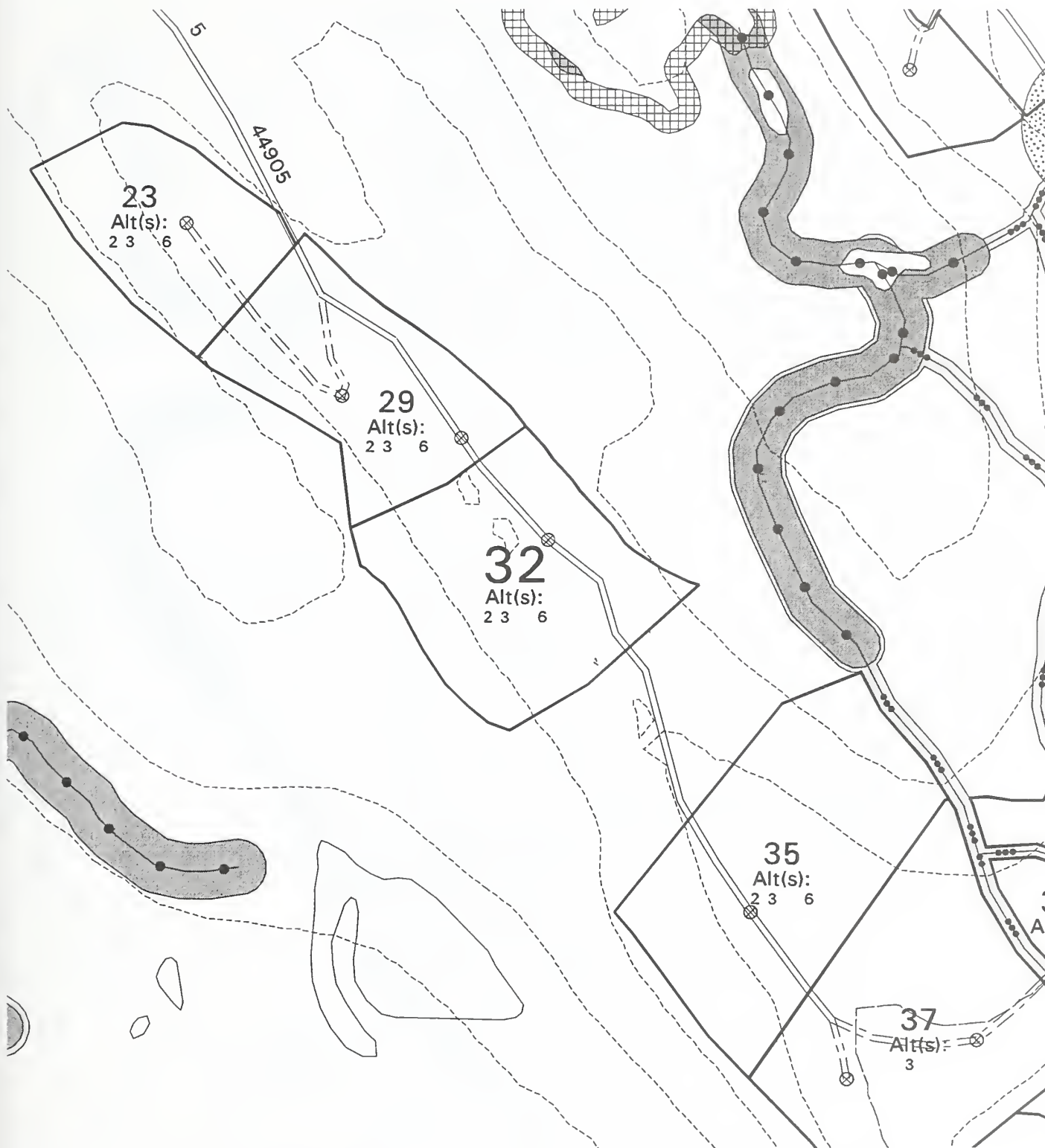
**Silvicultural Prescription**

Group Selection - 30% removal (Alternatives 2 and 6)  
Clearcut with Reserves (Alternative 3)

**Logging System and Unit Design**

Unit boundary follows low volume timber/muskeg along the east and west boundary. South boundary follows a logical yarding boundaries. North boundary has common boundary with Unit 29. Combination of shovel and cable systems with short temporary road are planned.

# Crystal Creek Timber Harvest Unit 32



Alternatives that include the proposed units are listed beneath the larger unit numbers.

- |  |                          |  |                                   |
|--|--------------------------|--|-----------------------------------|
|  | Proposed Unit Boundaries |  | AHMU-Class II Streams             |
|  | Non-NF Lands             |  | AHMU-Class III Streams            |
|  | Existing Managed Stands  |  | AHMU-Class IV Streams             |
|  | TTRA Buffers             |  | Lakes and Major Rivers            |
|  | Riparian Management Area |  | Existing Forest Development Roads |
|  | Lake Buffers             |  | Existing Closed Roads             |
|  | Waterfowl Buffers        |  | Proposed Forest Development Roads |
|  | AHMU-Class I Streams     |  | Proposed Temporary Roads          |

- |  |                          |
|--|--------------------------|
|  | Landings                 |
|  | 500-ft. Contour Interval |
|  | 100-ft. Contour Interval |

0 660 1320

Scale is 1 inch = 660 feet

**Crystal Creek Unit Card**  
**Unit 33**

Acres: 9      Alternative (s): 5  
1977 Aerial Photo: Flight #: 52

MBF Volume: 222  
Photo #: 64

MCF Volume : 57

## **Resource Concerns and Mitigation**

### **Hydrology**

Concern: High Contained, Class III stream channel to the southwest of the unit.

Mitigation: No Programmed commercial timber harvest within the Riparian Management Area, defined as the V-notch (side-slope break). Directional fall trees away from the notch.

### **Scenery**

Concern: Portion of unit visible from Frederick Sound and Thomas Bay.

Mitigation: Unit as designed addresses scenic concern.

### **Landslide Prone Soils**

Concern: Isolated areas of steep slope located in the eastern portion of the unit in association with rock outcroppings and cliffs.

Mitigation: The eastern half of the unit has been deleted.

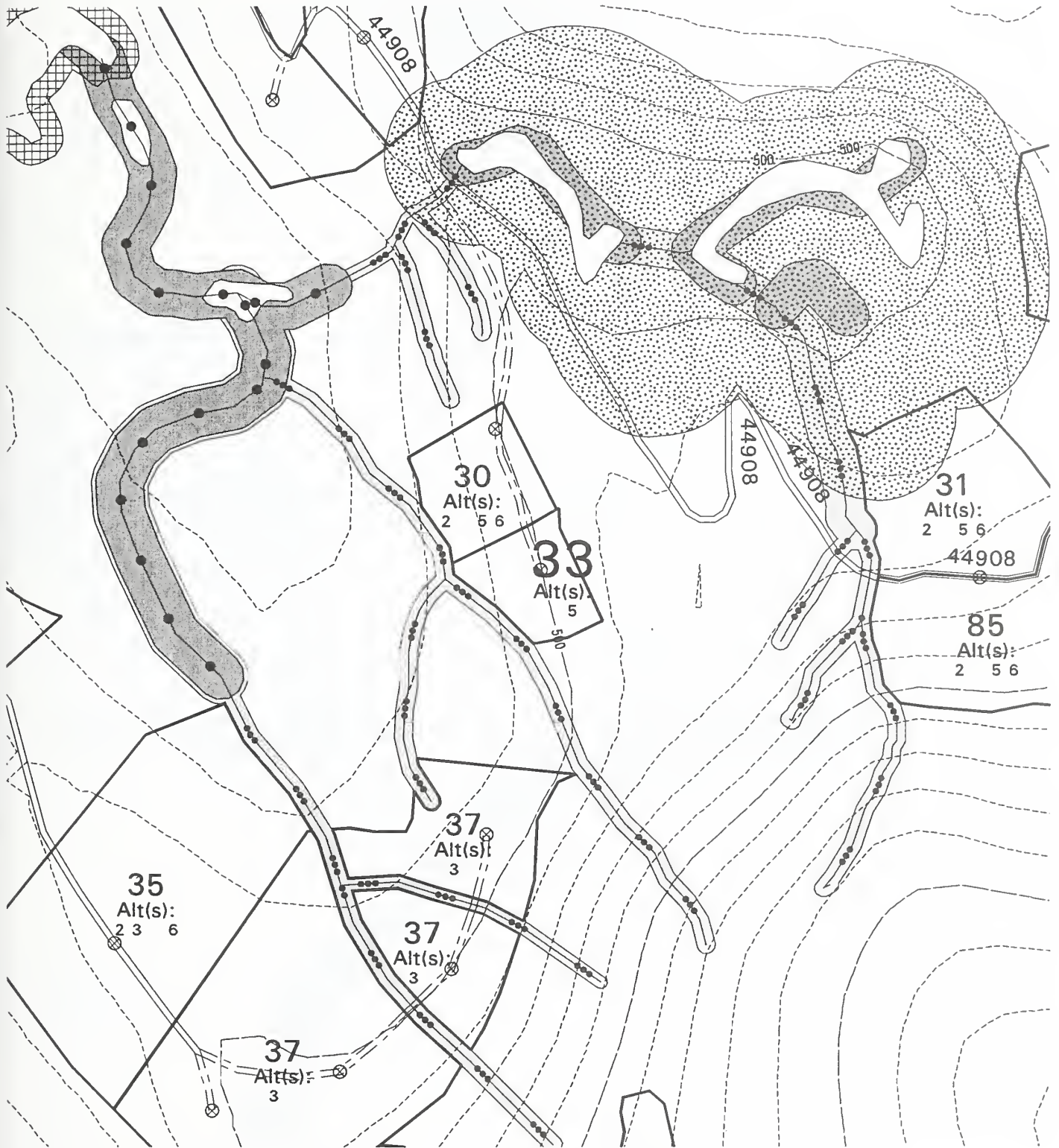
## **Silvicultural Prescription**

Clearcut with Reserves

## **Logging System and Unit Design**

Slope breaks and Class III stream determine unit boundaries. Temporary road required to minimize cable yarding distance to landing.

# Crystal Creek Timber Harvest Unit 33



Alternatives that include the proposed units are listed beneath the larger unit numbers.

- |  |                          |  |                                   |
|--|--------------------------|--|-----------------------------------|
|  | Proposed Unit Boundaries |  | AHMU-Class II Streams             |
|  | Non-NF Lands             |  | AHMU-Class III Streams            |
|  | Existing Managed Stands  |  | AHMU-Class IV Streams             |
|  | TTRA Buffers             |  | Lakes and Major Rivers            |
|  | Riparian Management Area |  | Existing Forest Development Roads |
|  | Lake Buffers             |  | Existing Closed Roads             |
|  | Waterfowl Buffers        |  | Proposed Forest Development Roads |
|  | AHMU-Class I Streams     |  | Proposed Temporary Roads          |

- |  |                          |
|--|--------------------------|
|  | Landings                 |
|  | 500-ft. Contour Interval |
|  | 100-ft. Contour Interval |



Scale is 1 inch = 660 feet



**Crystal Creek Unit Card**  
**Unit 34**

Acres: 47      Alternative (s): 5  
1977 Aerial Photo: Flight #: 49

MBF Volume: 267  
Photo #: 154

MCF Volume: 68

## **Resource Concerns and Mitigation**

### **Wildlife**

Concern: Goose nesting likely within or adjacent to the unit.

Mitigation: Use single-tree selection harvest method. Prohibit tree falling, yarding, and road construction within the unit during the period of April 1 to July 31.

### **Fisheries**

Concern: Palustrine, Class I channel to the south of the unit.

Mitigation: No commercial timber harvest within 100 feet of the stream. No programmed commercial timber harvest in the Riparian Management Area.

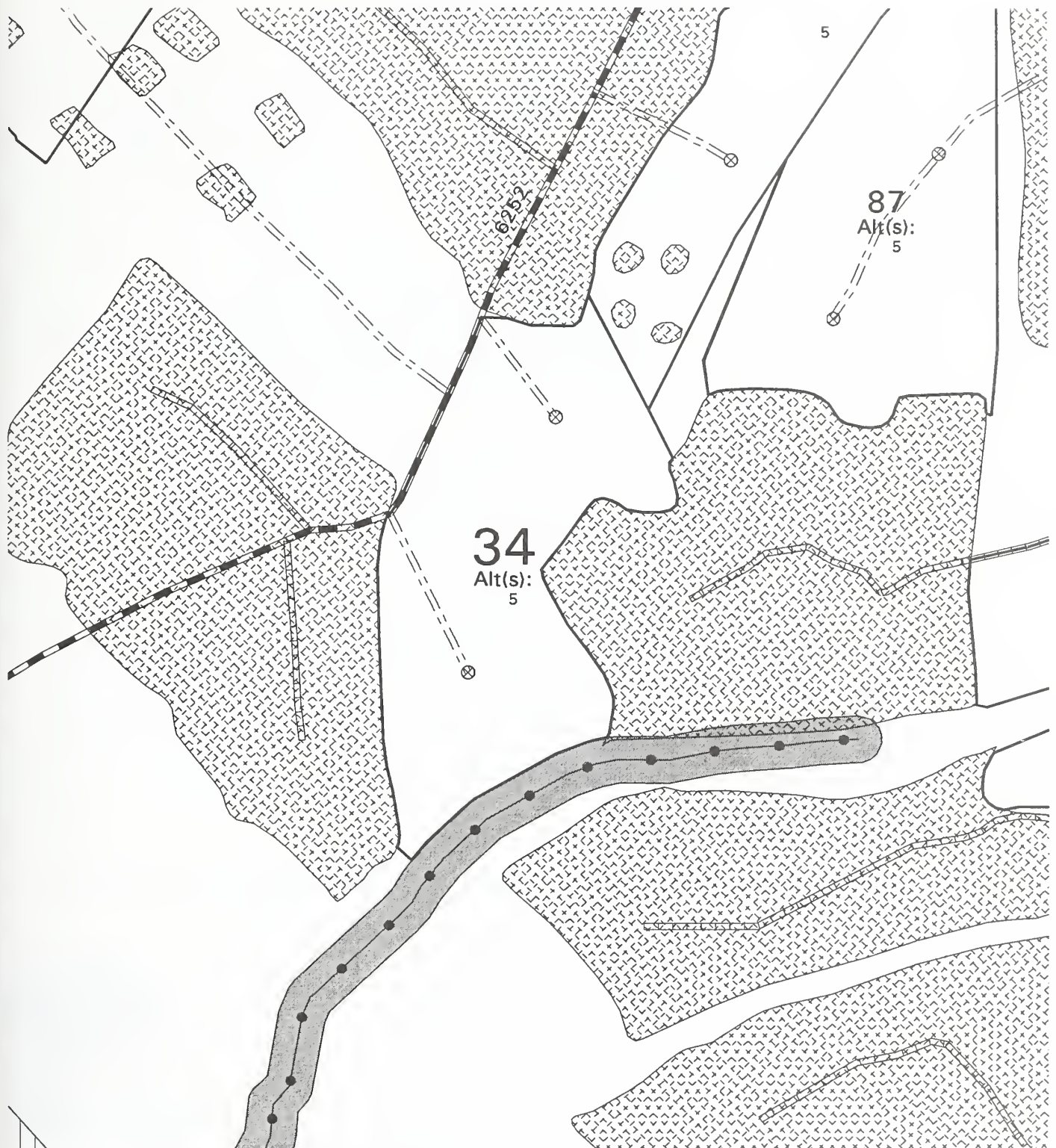
## **Silvicultural Prescription**

Single-tree selection with 20% removal.

## **Logging System and Unit Design**

East and west boundary borders managed stands. South boundary borders Class I stream plus 100 foot buffer. North boundary is common with Unit 19. Flat ground accessed by two short temporary roads to minimize shovel yarding distance which minimizes soil disturbance.

# Crystal Creek Timber Harvest Unit 34



Alternatives that include the proposed units are listed beneath the larger unit numbers.

- |  |                          |  |                                   |
|--|--------------------------|--|-----------------------------------|
|  | Proposed Unit Boundaries |  | AHMU-Class II Streams             |
|  | Non-NF Lands             |  | AHMU-Class III Streams            |
|  | Existing Managed Stands  |  | AHMU-Class IV Streams             |
|  | TTRA Buffers             |  | Lakes and Major Rivers            |
|  | Riparian Management Area |  | Existing Forest Development Roads |
|  | Lake Buffers             |  | Existing Closed Roads             |
|  | Waterfowl Buffers        |  | Proposed Forest Development Roads |
|  | AHMU-Class I Streams     |  | Proposed Temporary Roads          |

- |  |                          |
|--|--------------------------|
|  | Landings                 |
|  | 500-ft. Contour Interval |
|  | 100-ft. Contour Interval |

0 660 1320

Scale is 1 inch = 660 feet

**Crystal Creek Unit Card**  
**Unit 35**

Acres: 33      Alternative (s): 2, 3, and 6      MBF Volume: 762      MCF Volume : 193  
1977 Aerial Photo: Flight #: 52      Photo #: 64

## **Resource Concerns and Mitigation**

### **Fisheries**

Concern: Moderate Gradient/Mixed Control channel to the north tip of the unit.

Mitigation: No commercial timber harvest within 100 feet of the Class I stream channel, and no programmed commercial timber harvest in the Riparian Management Area (greatest of flood plain, riparian vegetation or soils, riparian associated wetland fens or 120 feet ( the height of one site-potential tree)).

### **Hydrology**

Concern: High Contained, Class III stream channel to the northeast of the unit.

Mitigation: No programmed commercial timber harvest within the Riparian Management Area, defined as the V-notch (side-slope break).

### **Scenery**

Concern: Portion of unit visible from Frederick Sound and Thomas Bay.

Mitigation: Unit as designed addresses scenic concern.

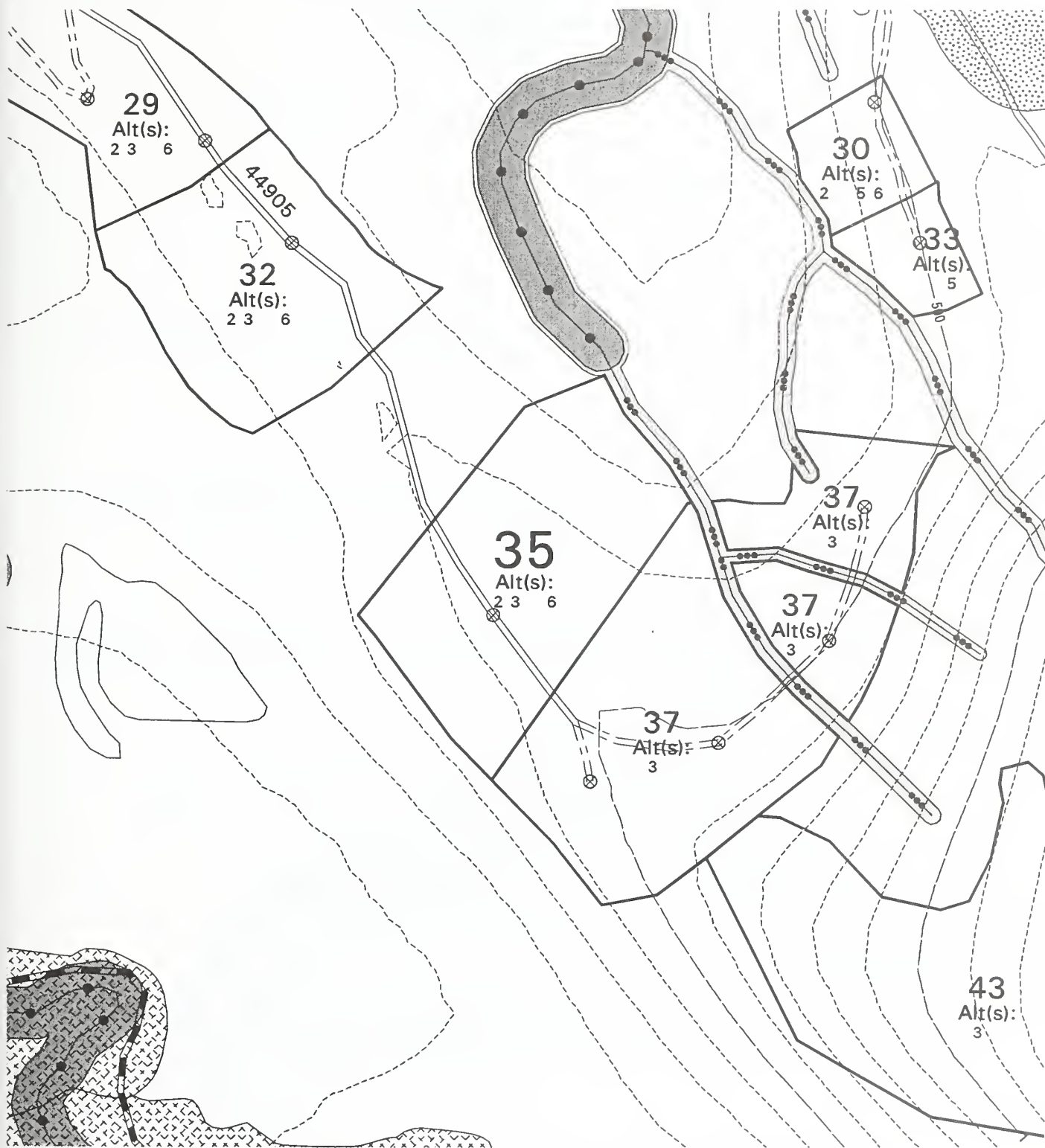
## **Silvicultural Prescription**

Clearcut with reserves

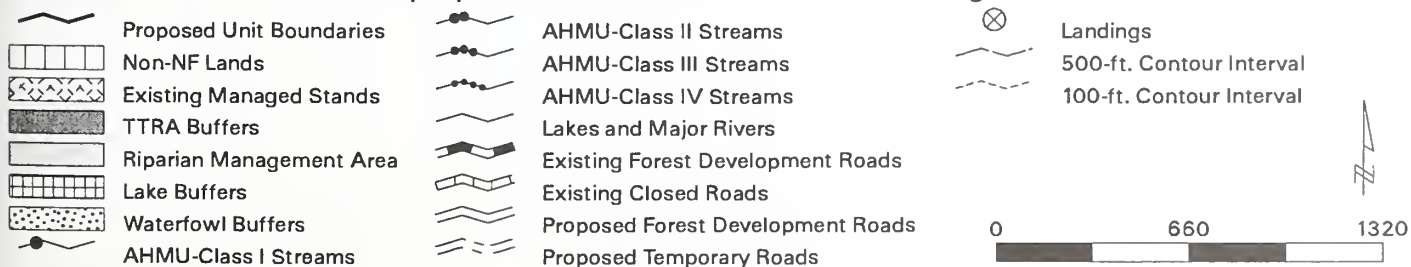
## **Logging System and Unit Design**

East and west boundaries follow slope breaks. South boundary is common with unit 37. Cable logging from temporary road.

# Crystal Creek Timber Harvest Unit 35



Alternatives that include the proposed units are listed beneath the larger unit numbers.





**Crystal Creek Unit Card**  
**Unit 36**

Acres: 13      Alternative (s): 5  
1977 Aerial Photo: Flight #: 50

MBF Volume: 115  
Photo #: 7

MCF Volume: 30

## **Resource Concerns and Mitigation**

### **Wildlife**

Concern: Goose nesting likely within or adjacent to the unit.

Mitigation: Prohibit tree falling and yarding in unit during the period of April 1 to July 31. Restrict harvest within waterfowl buffer to single-tree selection with 40% maximum removal of basal area this entry.

### **Fisheries**

Concern: Palustrine, Class I channel east of the unit.

Mitigation: No commercial timber harvest within 100 feet of the channel. No programmed commercial timber harvest in the Riparian Management Area (greatest of floodplain, riparian vegetation or soils or riparian associated wetland fens).

Concern: Glacial Outwash, Class I channel to the south of the unit.

Mitigation: No commercial timber harvest within 100 feet of the channel. No programmed commercial timber harvest in the Riparian Management Area (greatest of floodplain, riparian vegetation or soils, riparian associated wetland fens, or 140 feet).

### **Wetlands**

Concern: Forest wetlands soils (Maybeso soil series) along northwestern border.

Mitigation: Unit is designed to avoid these soils.

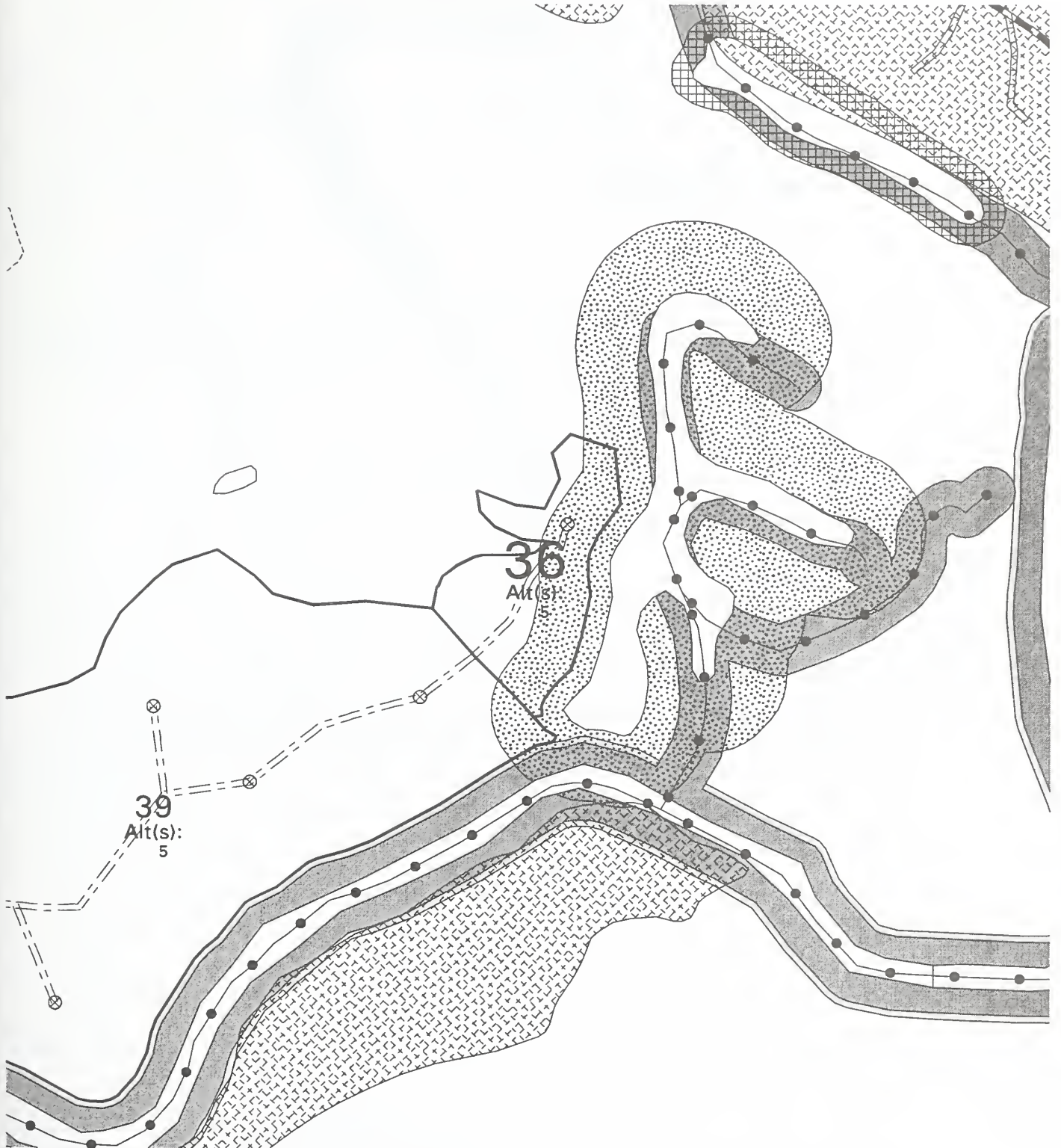
## **Silvicultural Prescription**

Group Selection - 40% removal: Use single-tree selection (40% removal) within the waterfowl buffer.

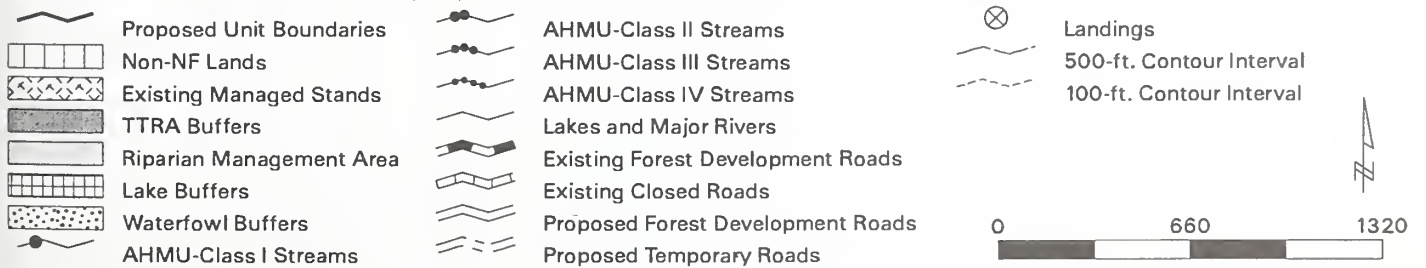
## **Logging System and Unit Design**

North and east boundary follows muskeg fringe. West boundary follows forested wetland soil type. Spur temporary road is used to minimize soil disturbance. Shovel logging is planned.

# Crystal Creek Timber Harvest Unit 36



Alternatives that include the proposed units are listed beneath the larger unit numbers.



**Crystal Creek Unit Card**  
**Unit 37**

Acres: 51      Alternative (s): 3  
1977 Aerial Photo: Flight #: 52

MBF Volume: 407  
Photo #: 64

MCF Volume: 104

**Resource Concerns and Mitigation**

**Hydrology**

Concern: High Gradient Contained, Class III stream channels dissect unit.

Mitigation: No programmed commercial timber harvest within the Riparian Management Area, defined as the V-notch (side-slope break).

**Scenery**

Concern: Portion of unit visible from Frederick Sound and Thomas Bay.

Mitigation: Unit as designed addresses scenic concern.

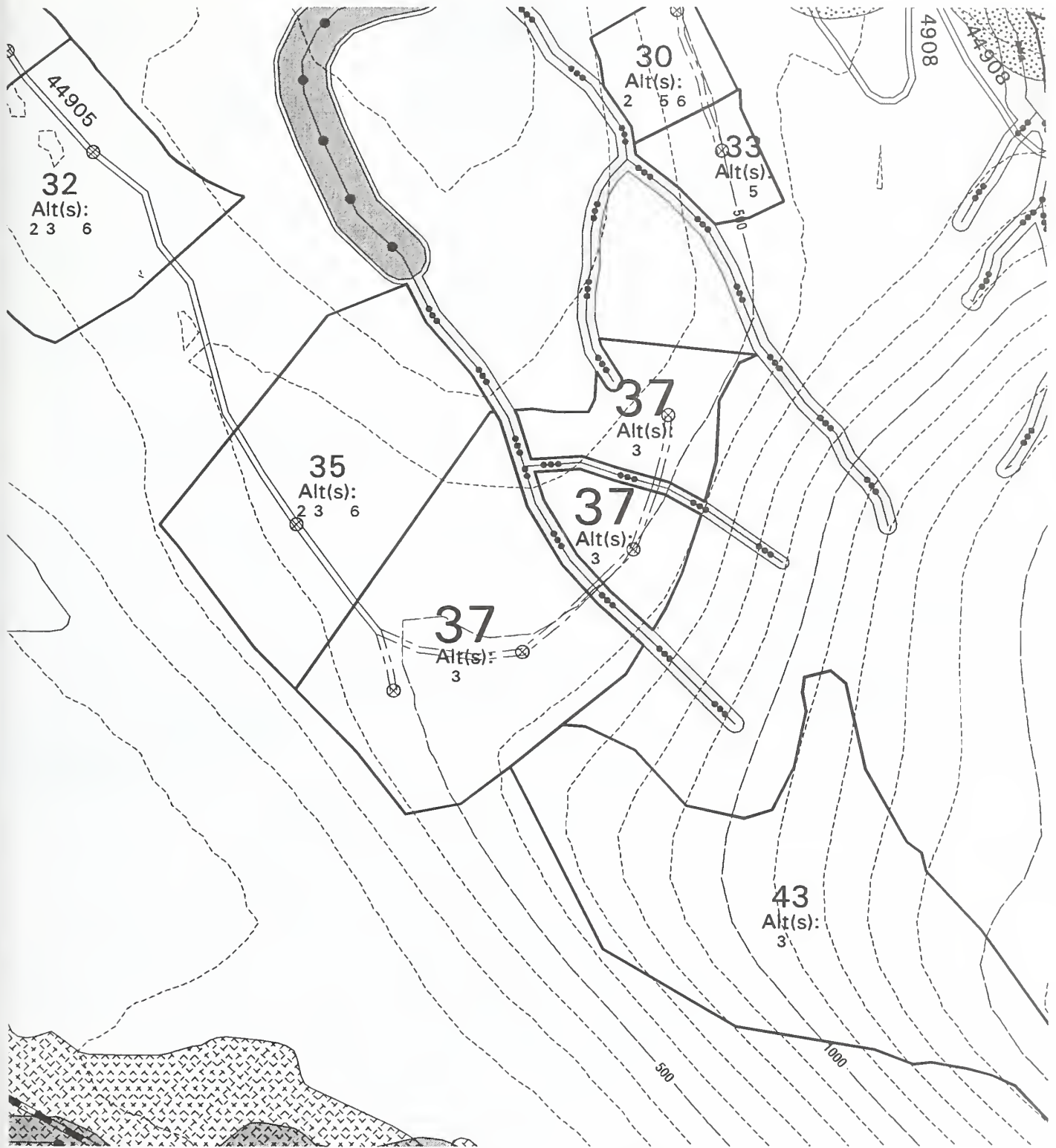
**Silvicultural Prescription**

Group Selection - 30% removal

**Logging System and Unit Design**

Northeast and south boundary follow slope break. West boundary common with unit 35. Class III stream concerns mitigated by temporary road with shovel and cable yarding.

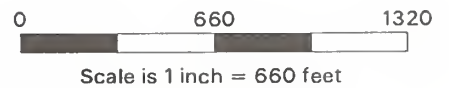
# Crystal Creek Timber Harvest Unit 37



Alternatives that include the proposed units are listed beneath the larger unit numbers.

- |  |                          |  |                                   |
|--|--------------------------|--|-----------------------------------|
|  | Proposed Unit Boundaries |  | AHMU-Class II Streams             |
|  | Non-NF Lands             |  | AHMU-Class III Streams            |
|  | Existing Managed Stands  |  | AHMU-Class IV Streams             |
|  | TTRA Buffers             |  | Lakes and Major Rivers            |
|  | Riparian Management Area |  | Existing Forest Development Roads |
|  | Lake Buffers             |  | Existing Closed Roads             |
|  | Waterfowl Buffers        |  | Proposed Forest Development Roads |
|  | AHMU-Class I Streams     |  | Proposed Temporary Roads          |

- |  |                          |
|--|--------------------------|
|  | Landings                 |
|  | 500-ft. Contour Interval |
|  | 100-ft. Contour Interval |





**Crystal Creek Unit Card**  
**Unit 38**

Acres: 21      Alternative (s): 5  
1977 Aerial Photo: Flight #: 49

MBF Volume: 116  
Photo #: 155

MCF Volume: 30

## **Resource Concerns and Mitigation**

### **Wildlife**

Concern: Goose nesting likely within or adjacent to the unit. Active osprey nest adjacent to the unit.

Mitigation: Use single-tree selection harvest method. Prohibit tree falling and yarding in unit during the period of April 1 and August 31.

Concern: Osprey nest to southeast of unit.

Mitigation: Maintain a minimum buffer of 330-feet. Prohibit tree falling and yarding in unit from April 15 to August 31.

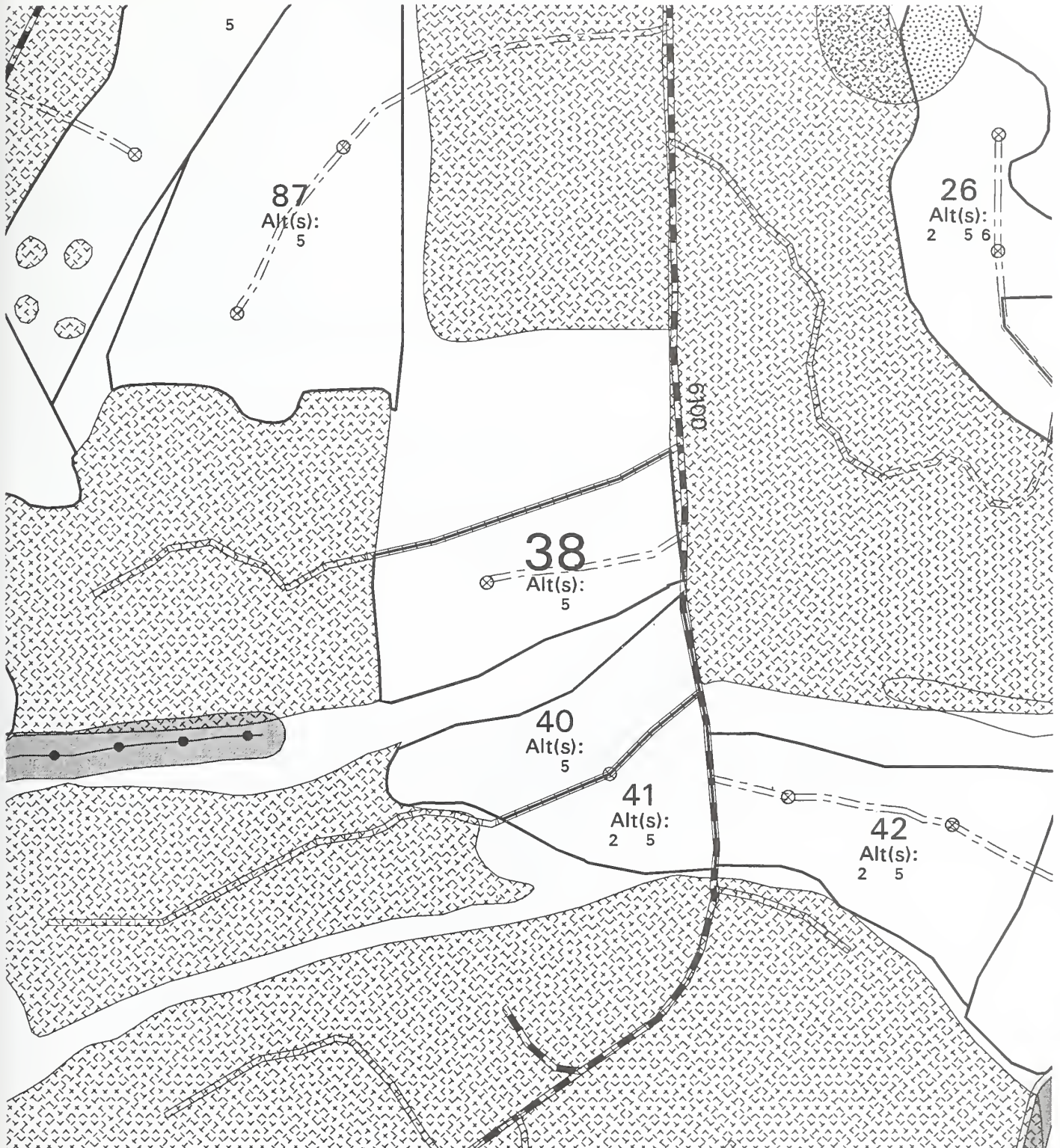
## **Silvicultural Prescription**

Single-tree Selection - 20% removal

## **Logging System and Unit Design**

East and west boundaries follow managed stands. North boundary follows Road 6100 and south boundary follow muskeg slough. Flat ground with shovel yarding will be used. Temporary road required to minimize yarding distance.

# Crystal Creek Timber Harvest Unit 38



Alternatives that include the proposed units are listed beneath the larger unit numbers.

- |  |                          |  |                                   |
|--|--------------------------|--|-----------------------------------|
|  | Proposed Unit Boundaries |  | AHMU-Class II Streams             |
|  | Non-NF Lands             |  | AHMU-Class III Streams            |
|  | Existing Managed Stands  |  | AHMU-Class IV Streams             |
|  | TTRA Buffers             |  | Lakes and Major Rivers            |
|  | Riparian Management Area |  | Existing Forest Development Roads |
|  | Lake Buffers             |  | Existing Closed Roads             |
|  | Waterfowl Buffers        |  | Proposed Forest Development Roads |
|  | AHMU-Class I Streams     |  | Proposed Temporary Roads          |

- Landings
- 500-ft. Contour Interval
- 100-ft. Contour Interval



Scale is 1 inch = 660 feet



**Crystal Creek Unit Card**  
**Unit 39**

Acres: 98      Alternative (s): 5  
1977 Aerial Photo: Flight #: 50

MBF Volume: 568  
Photo #: 7

MCF Volume : 30

## **Resource Concerns and Mitigation**

### **Wildlife**

Concern: Goose nesting likely within or adjacent to the unit.

Mitigation: Use single-tree selection harvest method. Prohibit tree falling and yarding in unit during the period of April 1 to July 31.

### **Fisheries**

Concern: Glacier Outwash Class I stream channel south of the unit.

Mitigation: No commercial timber harvest within 100 feet of the channel. No commercial timber harvest within the flood plain. No programmed commercial timber harvest in the Riparian Management Area (greatest of the flood plain, riparian vegetation or soils, riparian associated wetland fens or 130 feet).

## **Silvicultural Prescription**

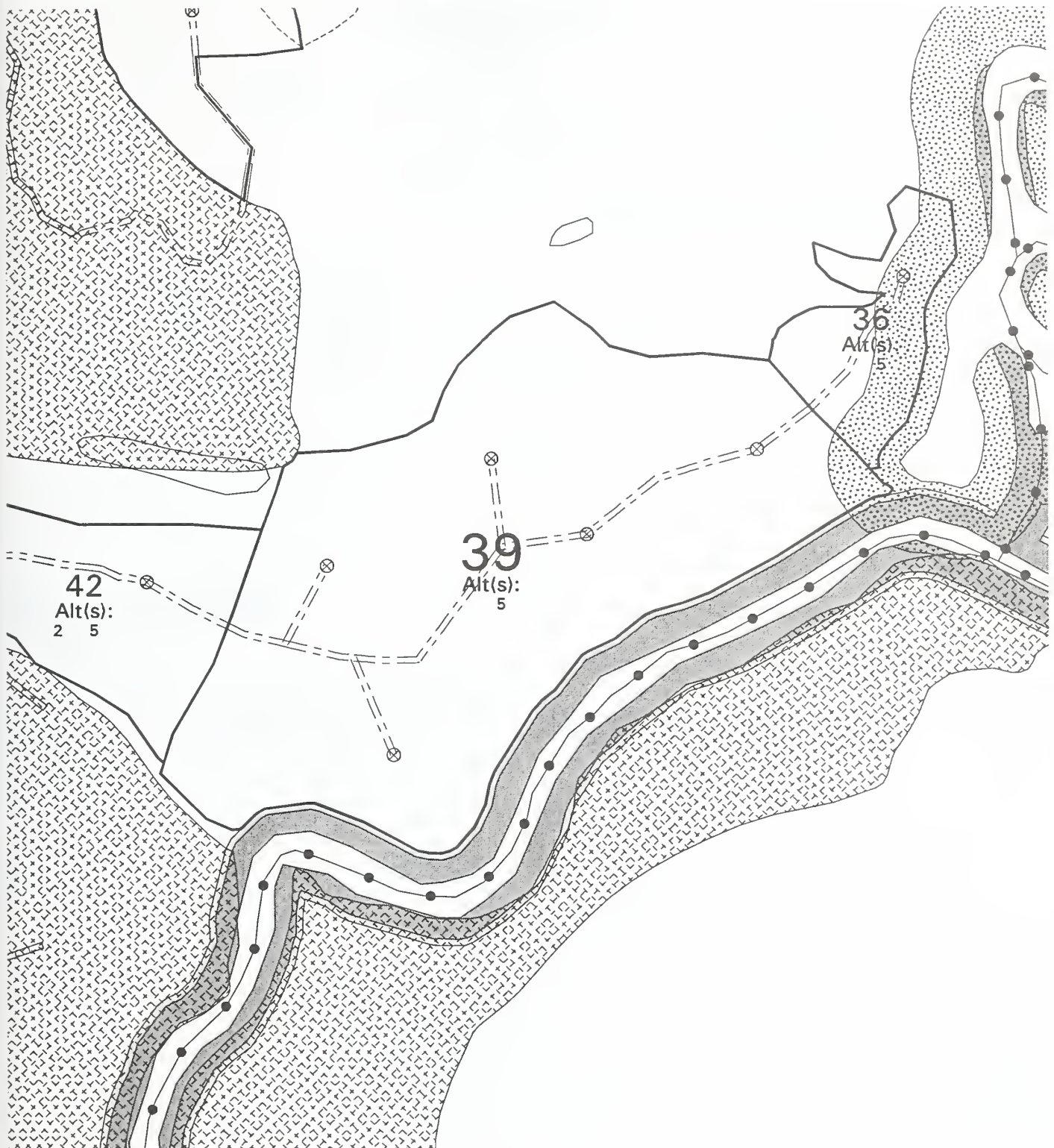
Single-tree Selection - 20% removal

## **Logging System and Unit Design**

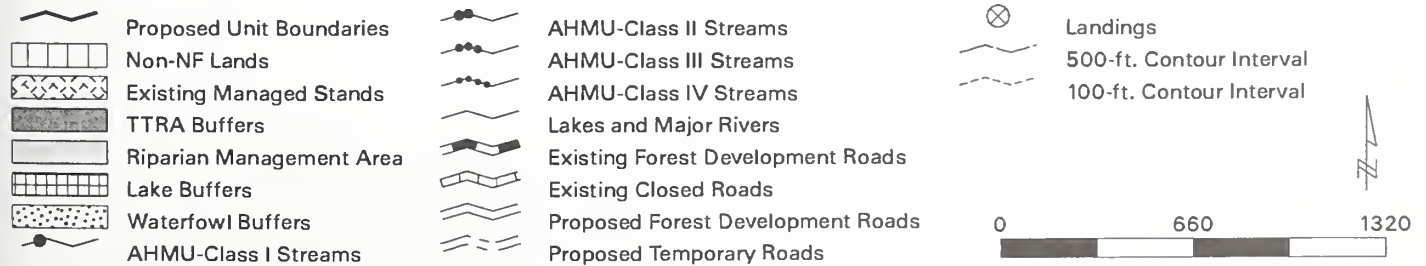
North boundary follows muskeg slough to common boundary with Unit 36 on east side. South boundary follows Muddy River plus 100 foot buffer. West boundary common with Unit 42. Flat ground with shovel yarding will be used. Temporary road required to minimize yarding distance for future entries.



# Crystal Creek Timber Harvest Unit 39



Alternatives that include the proposed units are listed beneath the larger unit numbers.





**Crystal Creek Unit Card**  
**Unit 40**

Acres: 14      Alternative (s): 5      MBF Volume: 75      MCF Volume : 19  
1977 Aerial Photo: Flight #: 49      Photo #: 155

## **Resource Concerns and Mitigation**

### **Wildlife**

Concern: Goose nesting likely within or adjacent to the unit. Active osprey nest adjacent to the unit.

Mitigation: Use single-tree selection harvest method. Prohibit tree falling and yarding in unit during the period April 1 to August 31.

Concern: Osprey nest to northwest of unit.

Mitigation: Maintain a minimum buffer of 330-feet. Prohibit tree falling and yarding in unit from April 15 to August 31.

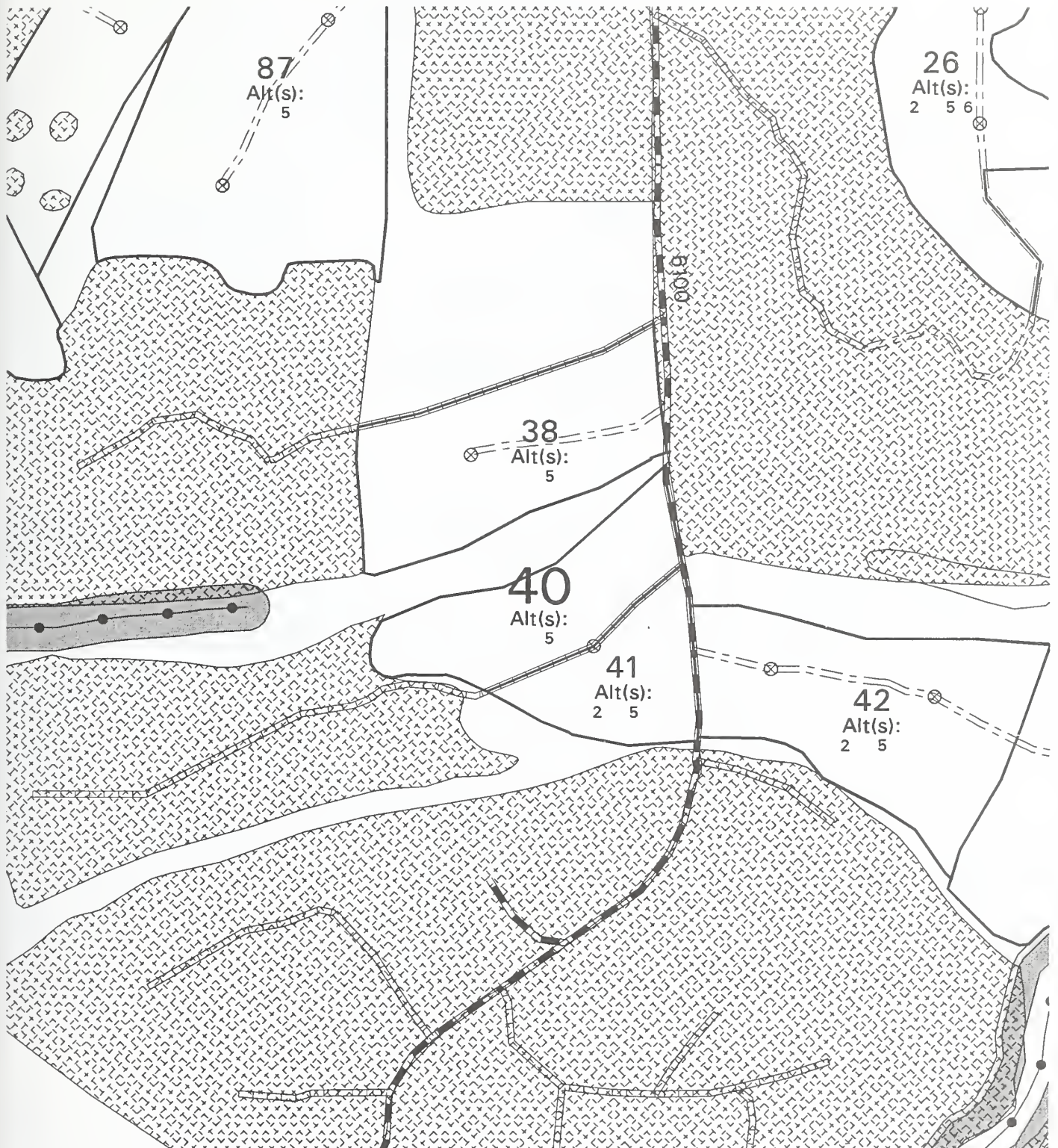
## **Silvicultural Prescription**

Single-tree Selection- 20% removal

## **Logging System and Unit Design**

North boundary follows muskeg slough. East and west boundary follows managed stands. South boundary follows specified road. Shovel yarding will be used.

# Crystal Creek Timber Harvest Unit 40



Alternatives that include the proposed units are listed beneath the larger unit numbers.

- |  |                          |  |                                   |
|--|--------------------------|--|-----------------------------------|
|  | Proposed Unit Boundaries |  | AHMU-Class II Streams             |
|  | Non-NF Lands             |  | AHMU-Class III Streams            |
|  | Existing Managed Stands  |  | AHMU-Class IV Streams             |
|  | TTRA Buffers             |  | Lakes and Major Rivers            |
|  | Riparian Management Area |  | Existing Forest Development Roads |
|  | Lake Buffers             |  | Existing Closed Roads             |
|  | Waterfowl Buffers        |  | Proposed Forest Development Roads |
|  | AHMU-Class I Streams     |  | Proposed Temporary Roads          |

- Landings
- 500-ft. Contour Interval
- 100-ft. Contour Interval



Scale is 1 inch = 660 feet



**Crystal Creek Unit Card**  
**Unit 41**

Acres: 10      Alternative (s): 2 and 5      MBF Volume: 214      MCF Volume : 54  
1977 Aerial Photo: Flight #:49      Photo #: 155

## **Resource Concerns and Mitigation**

### **Wildlife**

Concern: Goose nesting likely within or adjacent to the unit.

Mitigation: Prohibit tree falling and yarding in unit during the period of April 1 to July 31. Top one large-diameter tree per three acres in clearcut portion of unit for future goose nest platforms and retain at least three large dead and dying trees/acre where feasible.

## **Silvicultural Prescription**

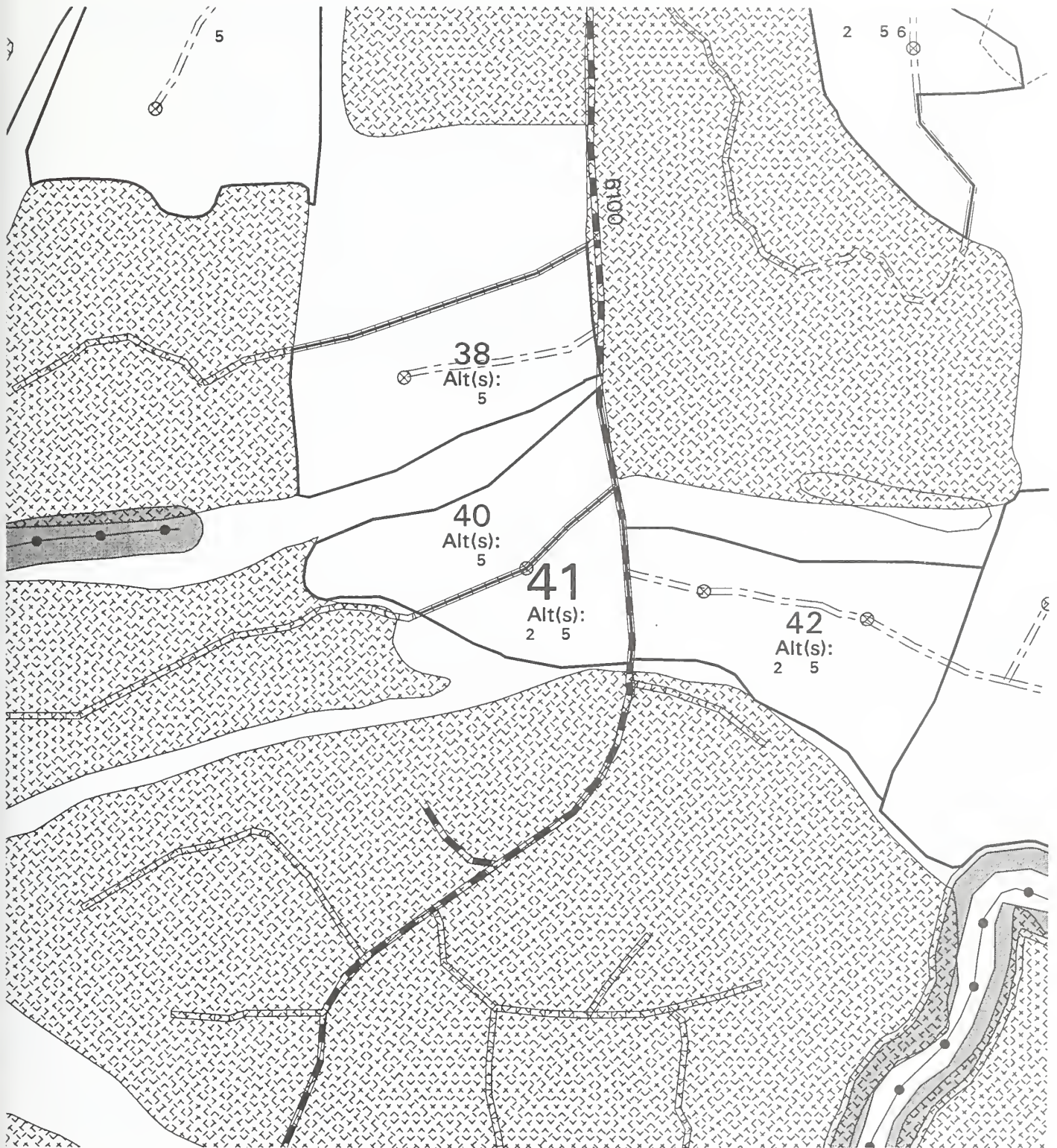
Clearcut with reserves. Look for opportunities to retain more than 15% of the basal area by leaving unmerchantable or large trees with low-economic value.

## **Logging System and Unit Design**

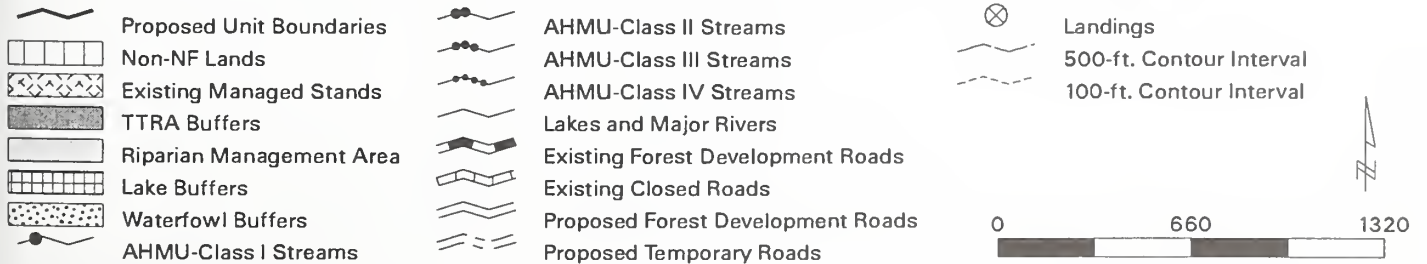
North and east boundary follows specified roads. South and southwest boundary follows managed stands. Shovel yarding will be used.



# Crystal Creek Timber Harvest Unit 41



Alternatives that include the proposed units are listed beneath the larger unit numbers.





**Crystal Creek Unit Card**  
**Unit 42**

Acres: 26      Alternative (s): 2 and 5      MBF Volume: 218, 290      MCF Volume : 55, 73  
1977 Aerial Photo: Flight #: 50      Photo #: 7

**Resource Concerns and Mitigation**

**Wildlife**

Concern: Goose nesting likely within or adjacent to the unit.

Mitigation: Use group selection harvest concentrating on salvage harvest of blowdown. Forest adjacent to beaver slough to the north of the unit deferred from harvest.

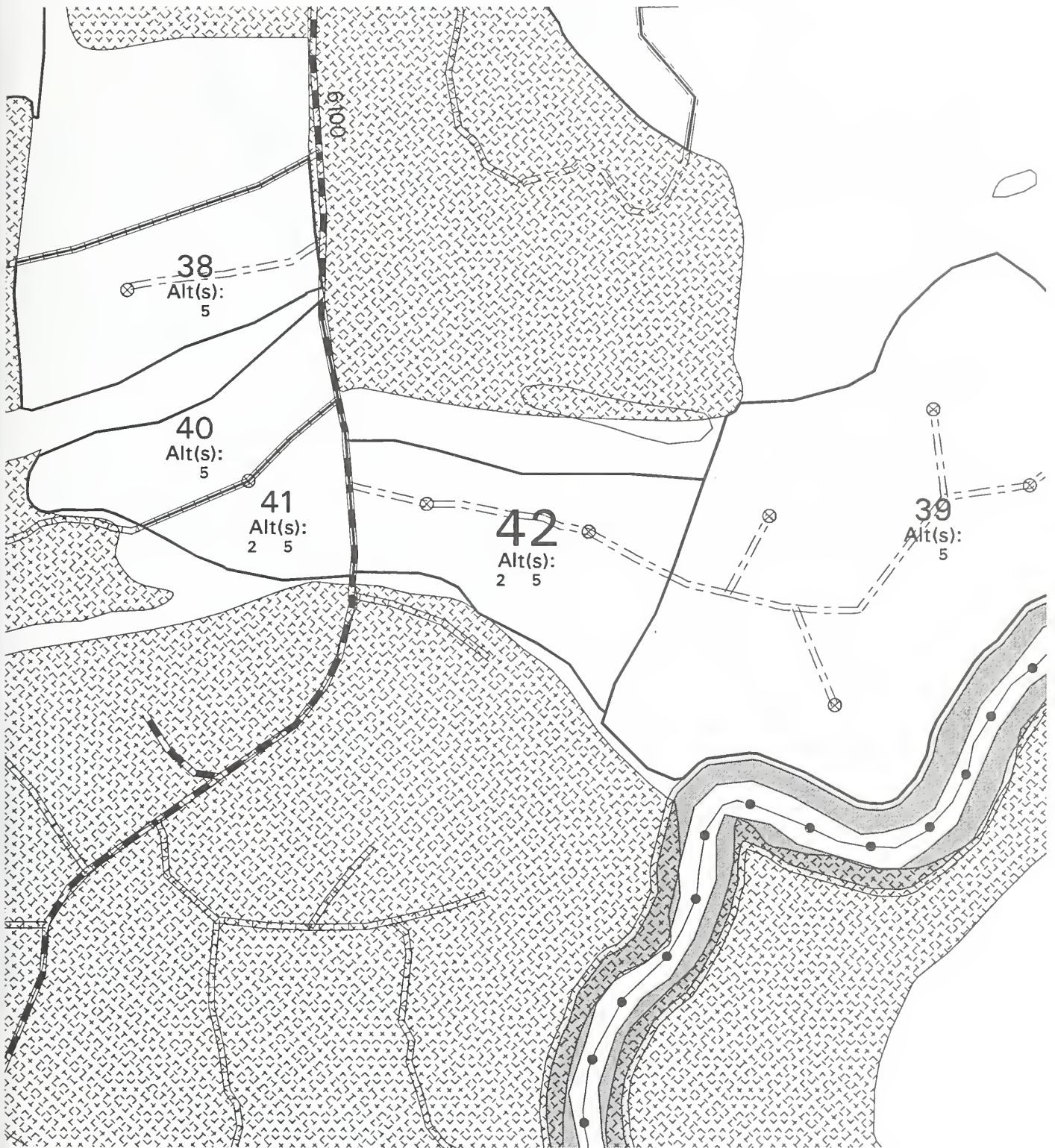
**Silvicultural Prescription**

Group Selection 30% removal (Alternative 2)  
Group Selection - 40% removal (Alternative 5)

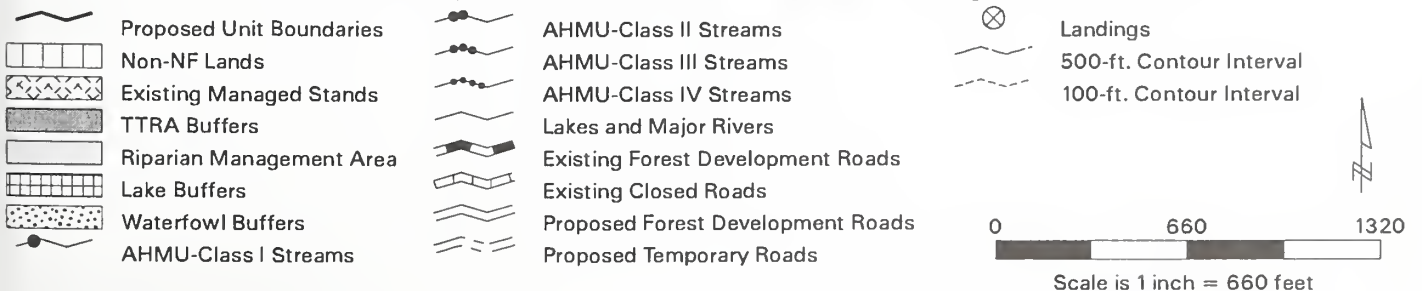
**Logging System and Unit Design**

West boundary along road 6100. East boundary along unit 39. North boundary along beaver slough. Managed stand to the south of the unit. Shovel yarding will be used.

# Crystal Creek Timber Harvest Unit 42



Alternatives that include the proposed units are listed beneath the larger unit numbers.



**Crystal Creek Unit Card**  
**Unit 43**

Acres: 54      Alternative (s): 3  
1977 Aerial Photo: Flight #: 53

MBF Volume: 154  
Photo #: 97

MCF Volume : 39

## **Resource Concerns and Mitigation**

### **Scenery**

Concern: Unit visible from Frederick Sound and Thomas Bay.

Mitigation: Silvicultural prescription (10 % removal) addresses scenic concern.

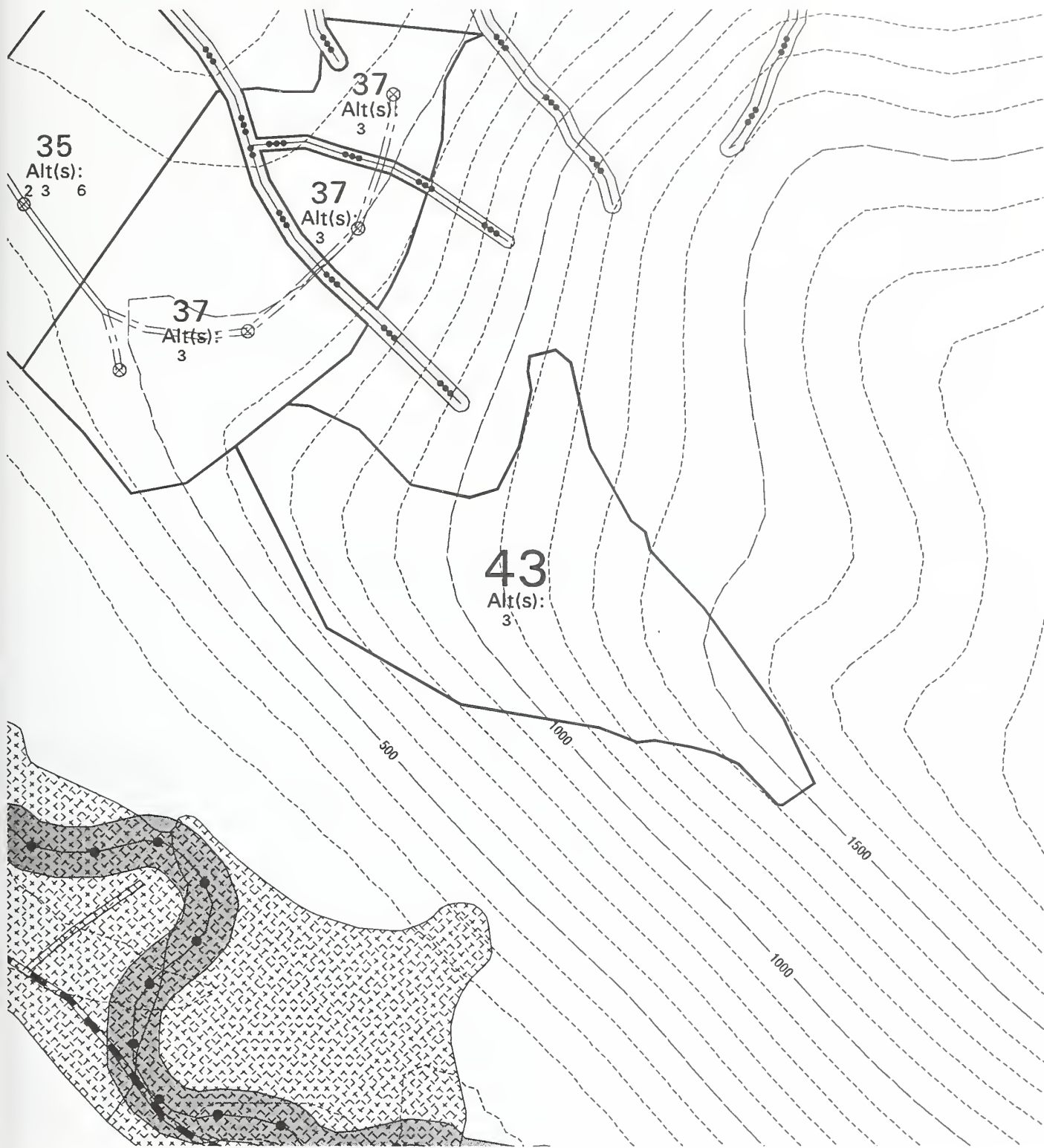
## **Silvicultural Prescription**

Group Selection - 10% removal

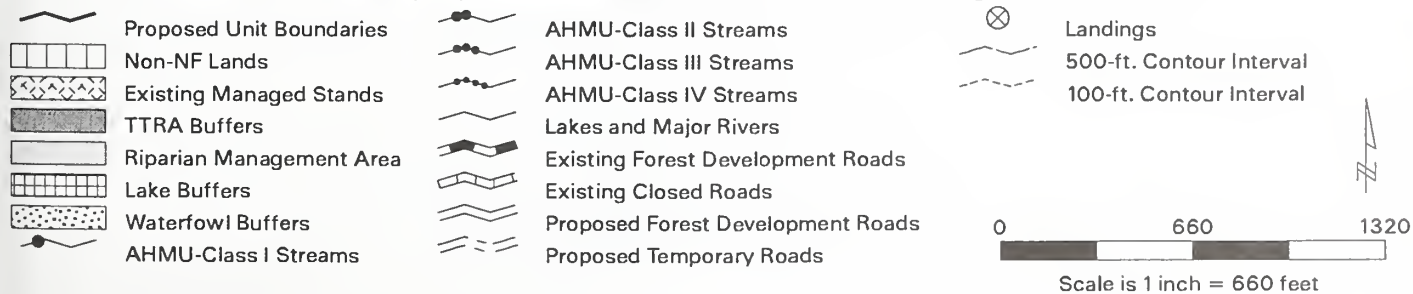
## **Logging System and Unit Design**

Southwest boundary follows slope contours avoiding extreme hazard soils. Northeast boundary follows muskeg. Unit is planned for helicopter yarding to landing in unit 37.

# Crystal Creek Timber Harvest Unit 43



Alternatives that include the proposed units are listed beneath the larger unit numbers.





## **Crystal Creek Unit Card**

### **Unit 44**

Acres: 28      Alternative (s): 2, 5, 6    MBF Volume: 235, 666, 235    MCF Volume: 60, 171, 60  
1977 Aerial Photo: Flight #: 54      Photo #: 158

## **Resource Concerns and Mitigation**

### **Scenery**

Concern: Upper portion of unit visible from Frederick Sound.

Mitigation: Undulate backline and upper 1/3 of northwest boundary line to eliminate straight edge appearance.

## **Silvicultural Prescription**

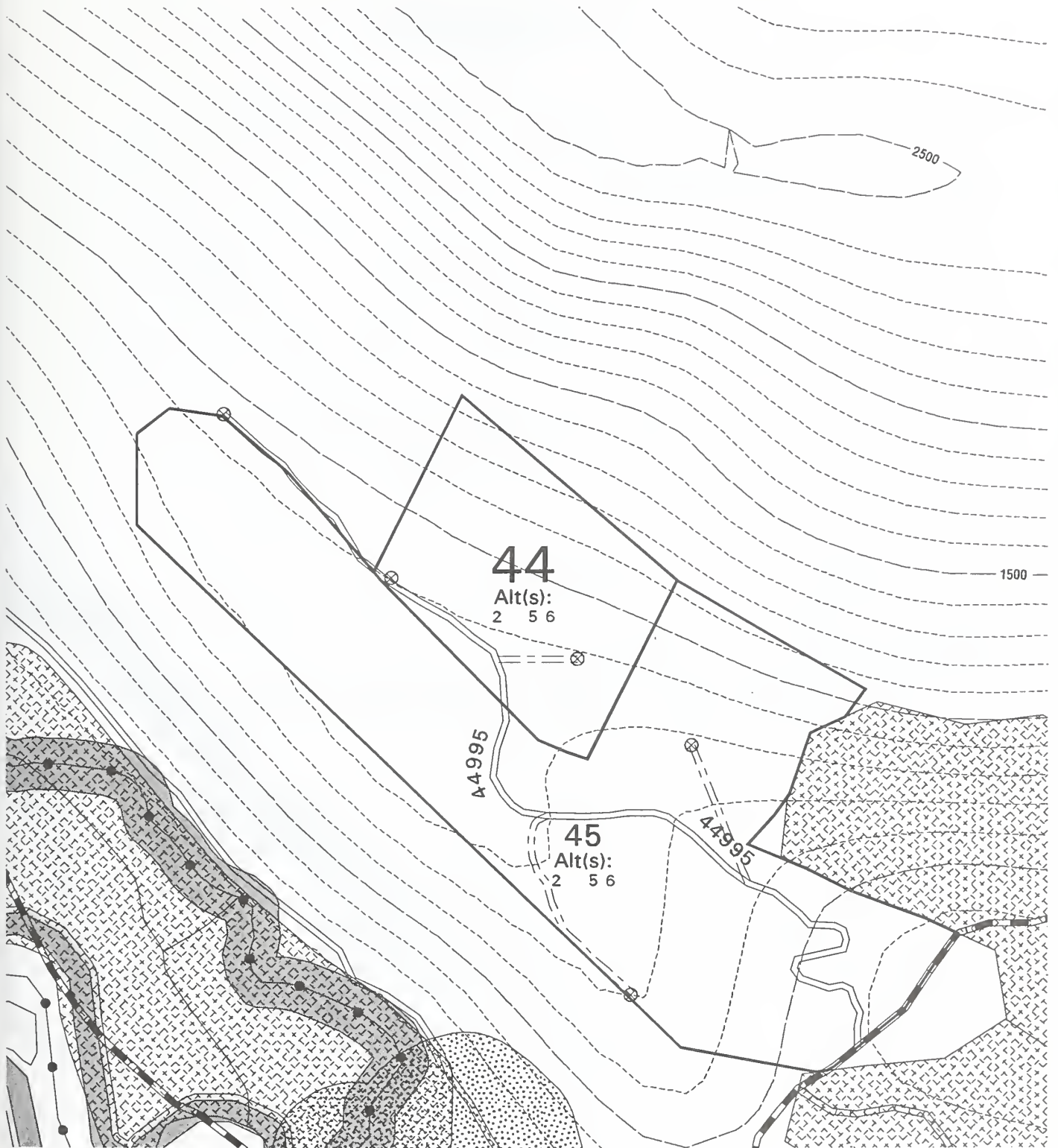
Group Selection - 30% removal (Alternative 2 and 6)

Clearcut with reserves - (Alternative 5)

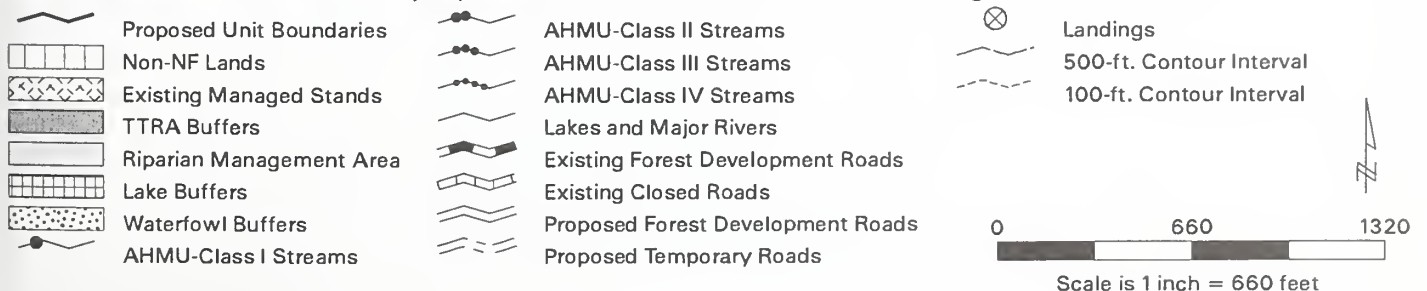
## **Logging System and Unit Design**

North and west boundary follows slope breaks avoiding oversteepened and isolated areas of steep slope. The south and east boundaries are common with Unit 45. Cable logging is planned.

# Crystal Creek Timber Harvest Unit 44



Alternatives that include the proposed units are listed beneath the larger unit numbers.



**Crystal Creek Unit Card**  
**Unit 45**

Acres: 89   Alternative (s): 2, 5, 6   MBF Volume: 748, 997, 748   MCF Volume : 192, 256, 192  
1977 Aerial Photo: Flight #: 54   Photo #: 158

**Resource Concerns and Mitigation**

**Scenery**

Concern: Portion of unit visible from Frederick Sound.

Mitigation: Unit as designed addresses scenic concern.

**Landslide Prone Soils**

Concern: Isolated areas of steep slope located along the west-central boundary of unit.

Mitigation: Retain some trees on landslide-prone terrain to maintain slope stability.

**Silvicultural Prescription**

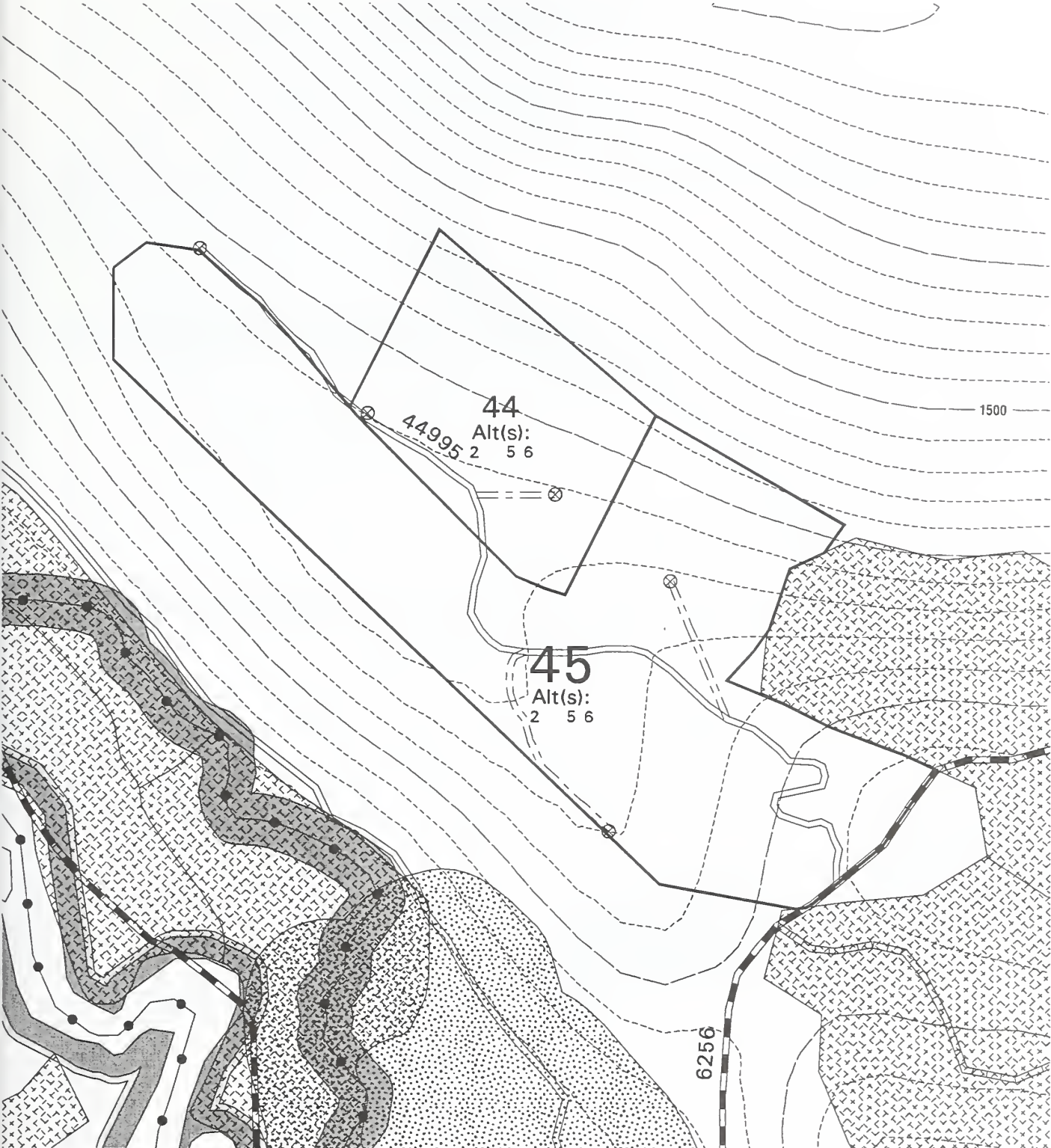
Group Selection - 30% removal (Alternative 2 and 6)

Group Selection - 40% removal (Alternative 5)

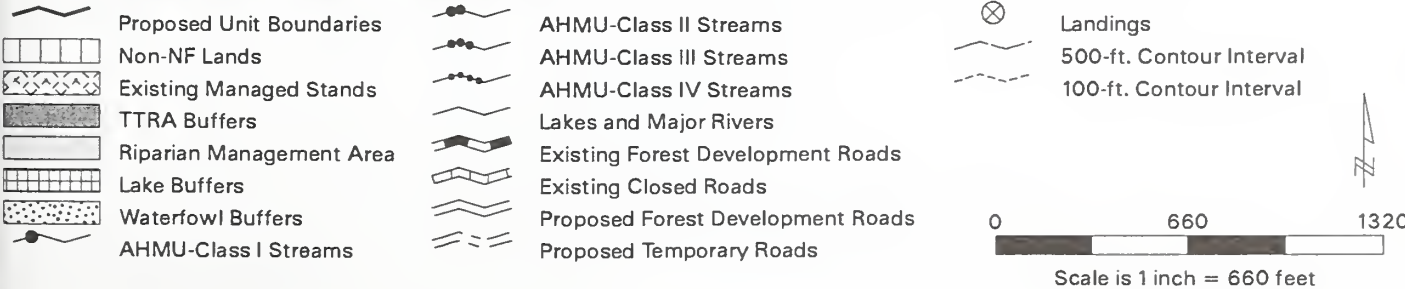
**Logging System and Unit Design**

West and south boundaries follow slope breaks. North boundary common with unit 44 and avoids unstable slopes. Combination of mobile yarder and shovel logging within unit.

Crystal Creek Timber Harvest Unit 45



Alternatives that include the proposed units are listed beneath the larger unit numbers.





**Crystal Creek Unit Card**  
**Unit 49**

Acres: 48      Alternative (s): 3  
1977 Aerial Photo: Flight #: 54

MBF Volume: 1159  
Photo #: 158

MCF Volume : 288

## **Resource Concerns and Mitigation**

### **Fisheries**

Concern: Palustrine, Class I stream channel northeast of the unit.

Mitigation: No commercial timber harvest within 100 feet of the channel. No programmed commercial timber harvest in the Riparian Management Area (greatest of flood plain, riparian vegetation or soils or riparian associated wetland fens).

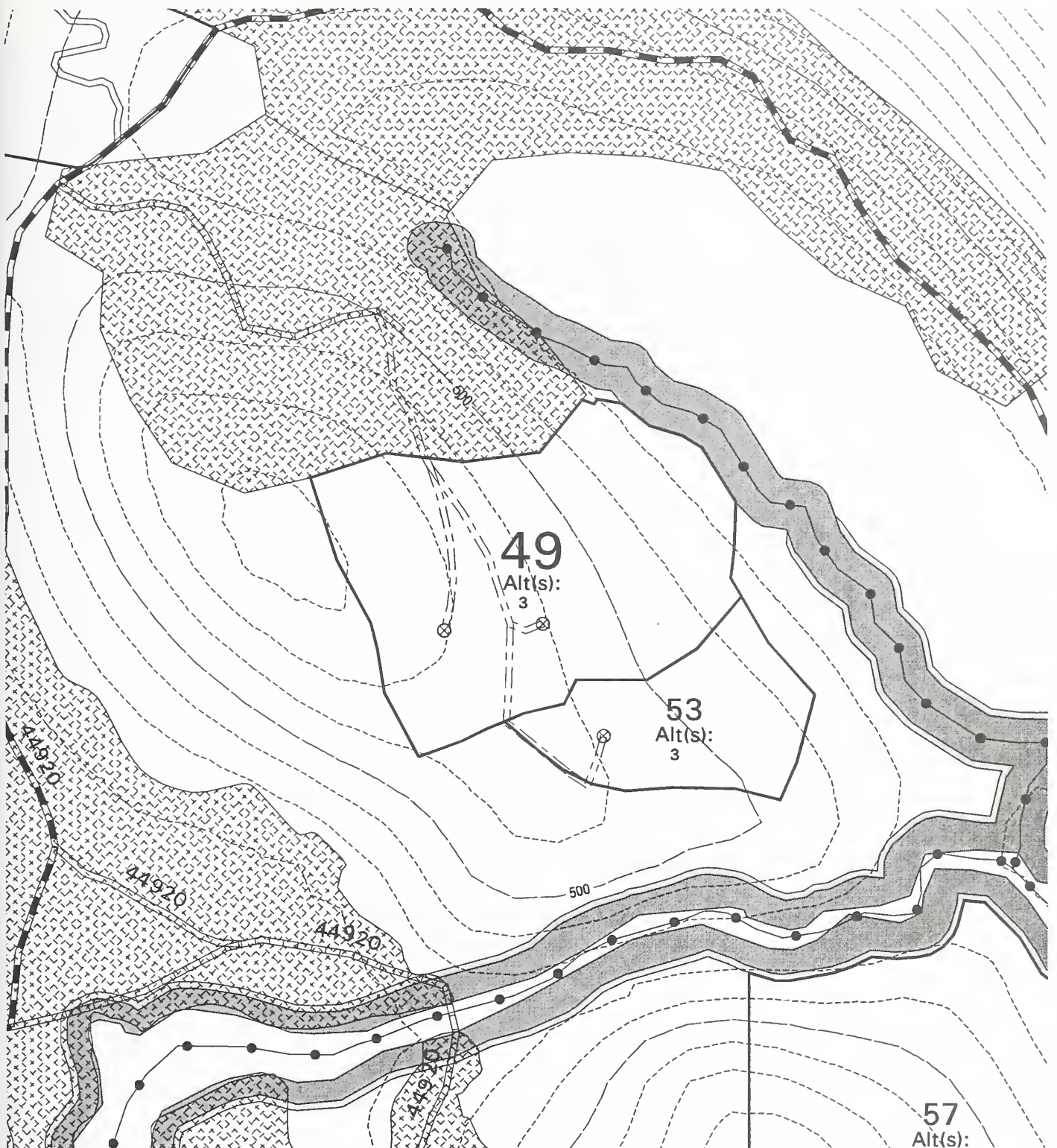
## **Silvicultural Prescription**

Clearcut with reserves

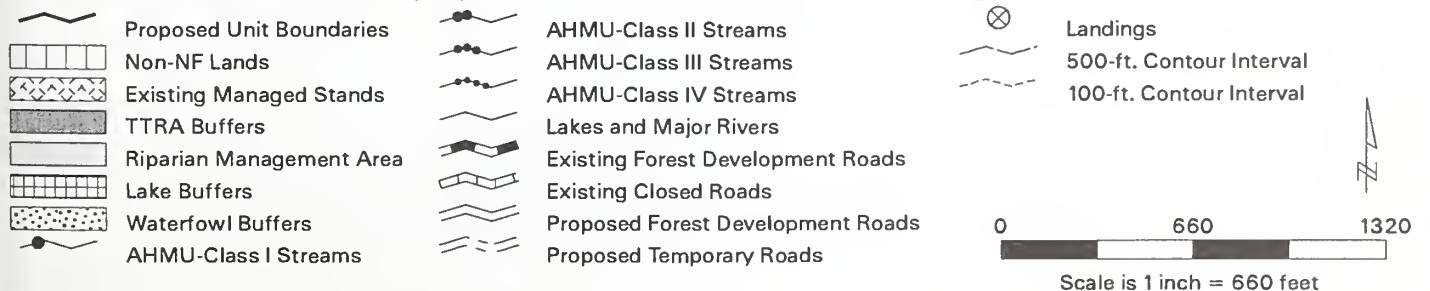
## **Logging System and Unit Design**

North boundary follows managed stands. East boundary follows slope break above Class I stream. Maintain wind firm buffer along the stream. South and west boundary is common with Unit 53. Multiple temporary roads which access other units will be used. Cable logging is planned.

# Crystal Creek Timber Harvest Unit 49



Alternatives that include the proposed units are listed beneath the larger unit numbers.



**Crystal Creek Unit Card**  
**Unit 50**

Acres: 51      Alternative (s): 2, 3, and 6      MBF Volume: 1170      MCF Volume : 321  
1977 Aerial Photo: Flight #: 53      Photo #: 99

## **Resource Concerns and Mitigation**

### **Fisheries**

Concern: Flood Plain, Class I stream channel to the northeast of the unit.

Mitigation: No commercial timber harvest within 100 feet of the channel. No commercial timber harvest in the flood plain. No programmed commercial timber harvest in the Riparian Management Area (greatest of the flood plain, riparian vegetation or soils, riparian associated wetland fens or 130 feet).

### **Hydrology**

Concern: High Gradient Contained, Class III stream channel to the southwest of the unit.

Mitigation: No programmed commercial timber harvest within the Riparian Management Area, defined as the V-notch (side-slope break).

### **Wetlands**

Concern: Forest wetland, Maybeso series soils, along southwest border.

Mitigation: Unit is designed to avoid these soils.

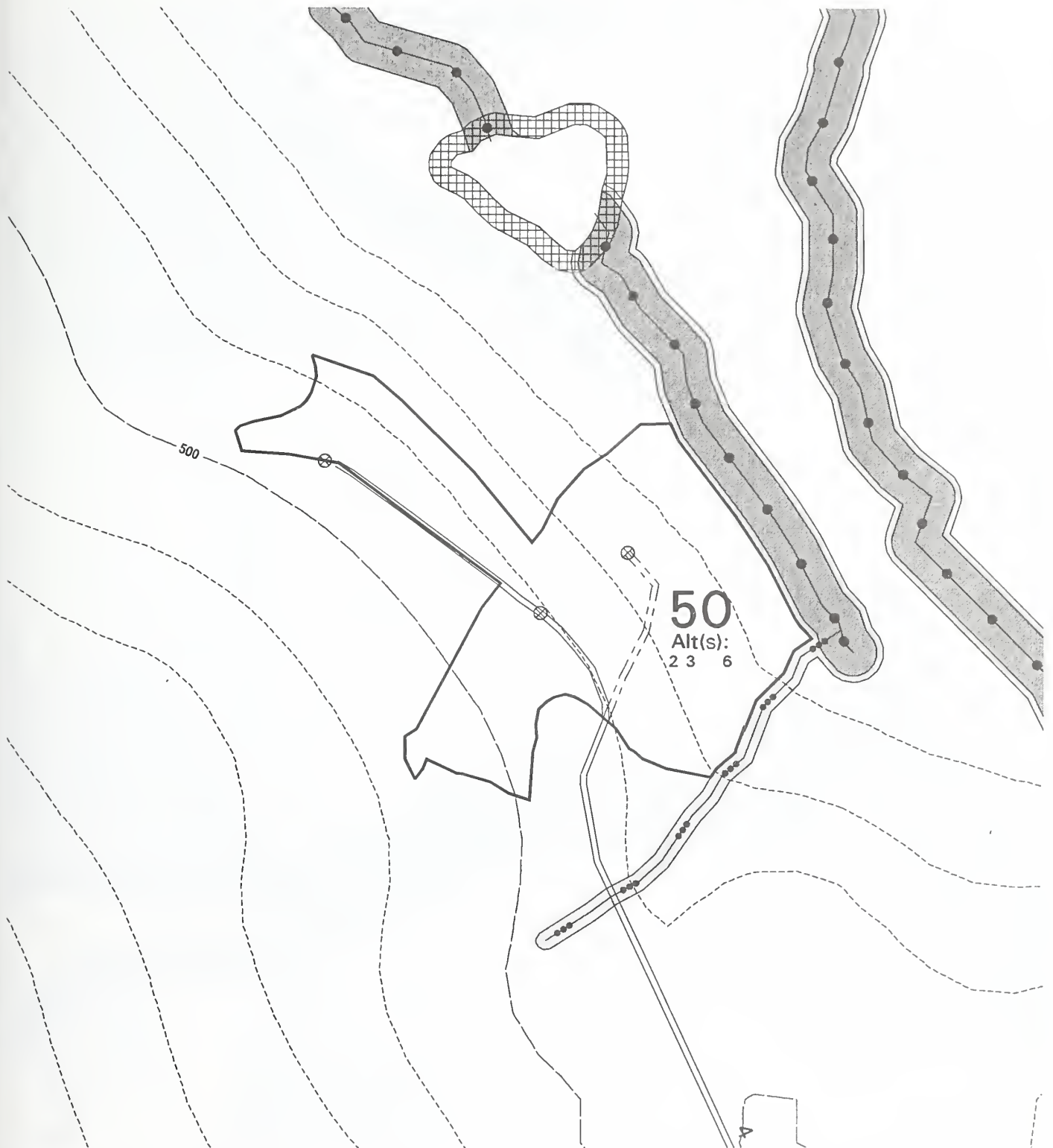
## **Silvicultural Prescription**

Clearcut with reserves. Look for opportunities to retain more than 15% of the basal area by leaving unmerchantable or large trees with low-economic value.

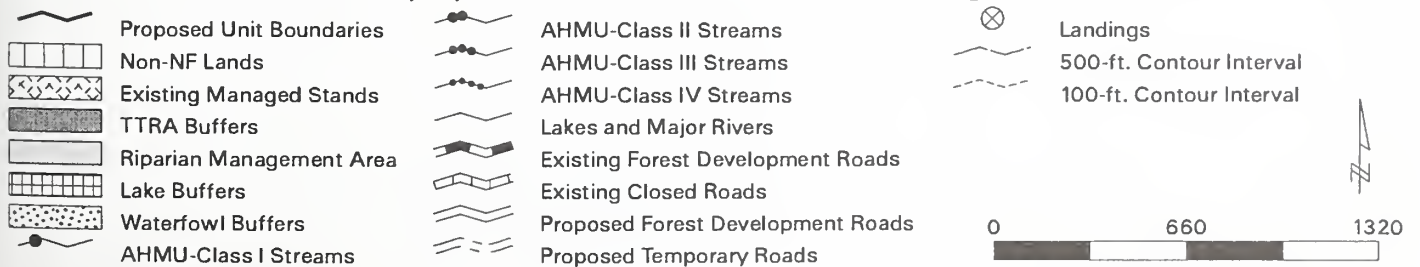
## **Logging System and Unit Design**

Unit boundary follows Class I stream to the north and a Class III stream to the east. The south and southwest boundaries follow forest wetland soils. A combination of cable and shovel yarding will minimize soil disturbance. A short temporary road is planned.

# Crystal Creek Timber Harvest Unit 50



Alternatives that include the proposed units are listed beneath the larger unit numbers.





**Crystal Creek Unit Card**  
**Unit 53**

Acres: 16      Alternative (s): 3      MBF Volume: 394, 46      MCF Volume: 101, 12  
1977 Aerial Photo: Flight #: 54      Photo #: 158

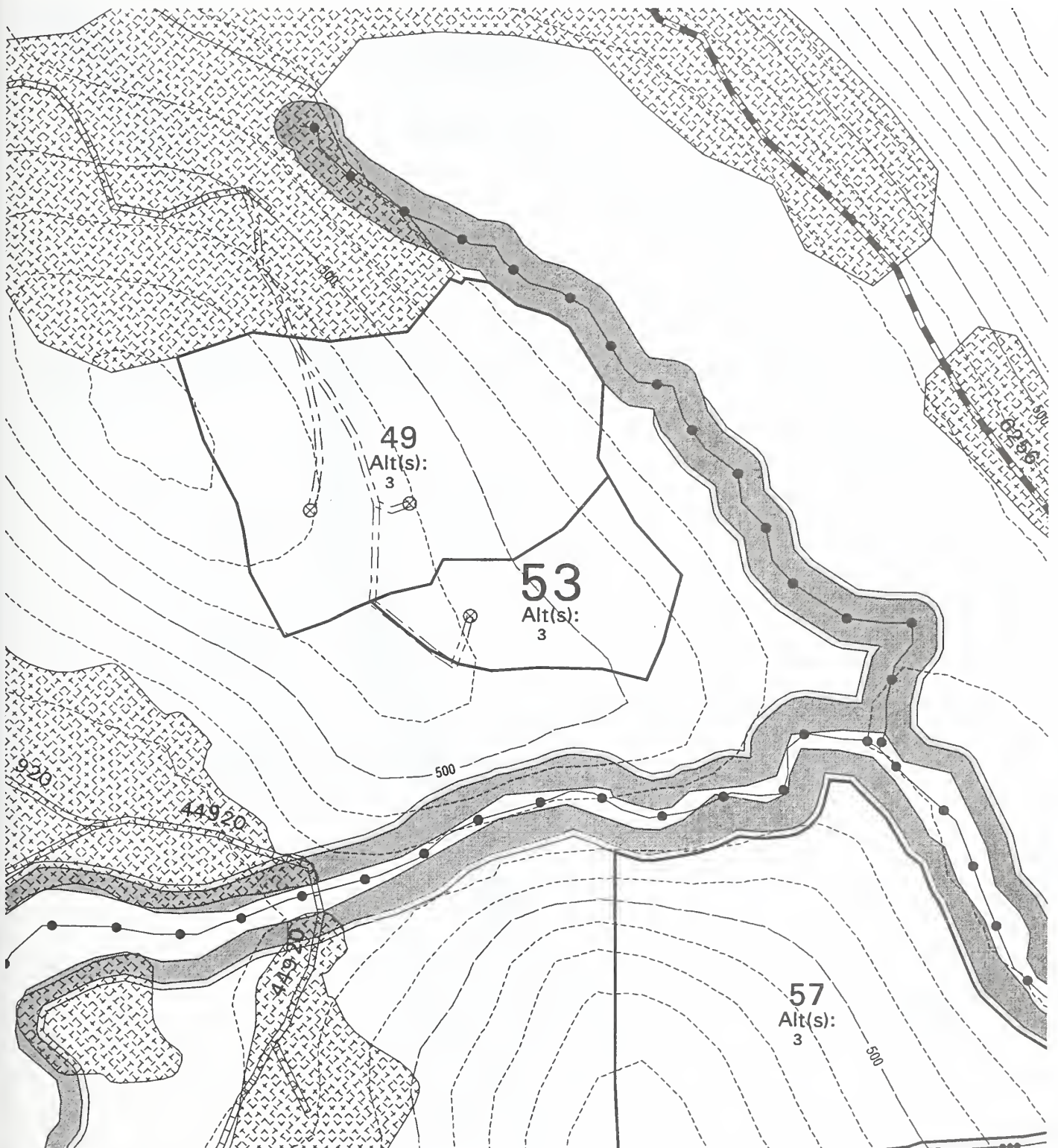
**Silvicultural Prescription**

Clearcut with reserves      (Alternative 3)

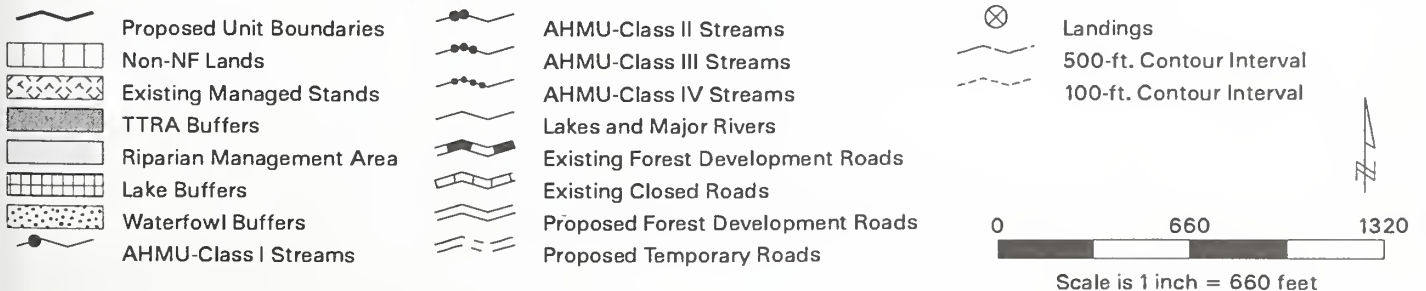
**Logging System and Unit Design**

The north, east, and south boundary follow slope breaks. The west boundary is common with Unit 49. A short temporary road will minimize cable yarding distance.

# Crystal Creek Timber Harvest Unit 53



Alternatives that include the proposed units are listed beneath the larger unit numbers.



**Crystal Creek Unit Card**  
**Unit 55**

Acres: 45      Alternative (s): 2 and 6      MBF Volume: 956      MCF Volume : 260  
1977 Aerial Photo: Flight #: 53      Photo #: 100

## **Resource Concerns and Mitigation**

### **Fisheries**

Concern: High Gradient Contained Class I and Class II stream channel to the west of the unit.

Mitigation: No commercial timber harvest within 100 feet of the channel. No programmed commercial timber harvest within the Riparian Management Area, defined as within 100 feet of the stream or to the top of the V-notch (side-slope break) whichever is greater.

### **Landslide Prone Soils**

Concern: Isolated areas of steep slope located along eastern boundary.

Mitigation: The unit is designed to avoid slopes exceeding 72% along the eastern border.

## **Silvicultural Prescription**

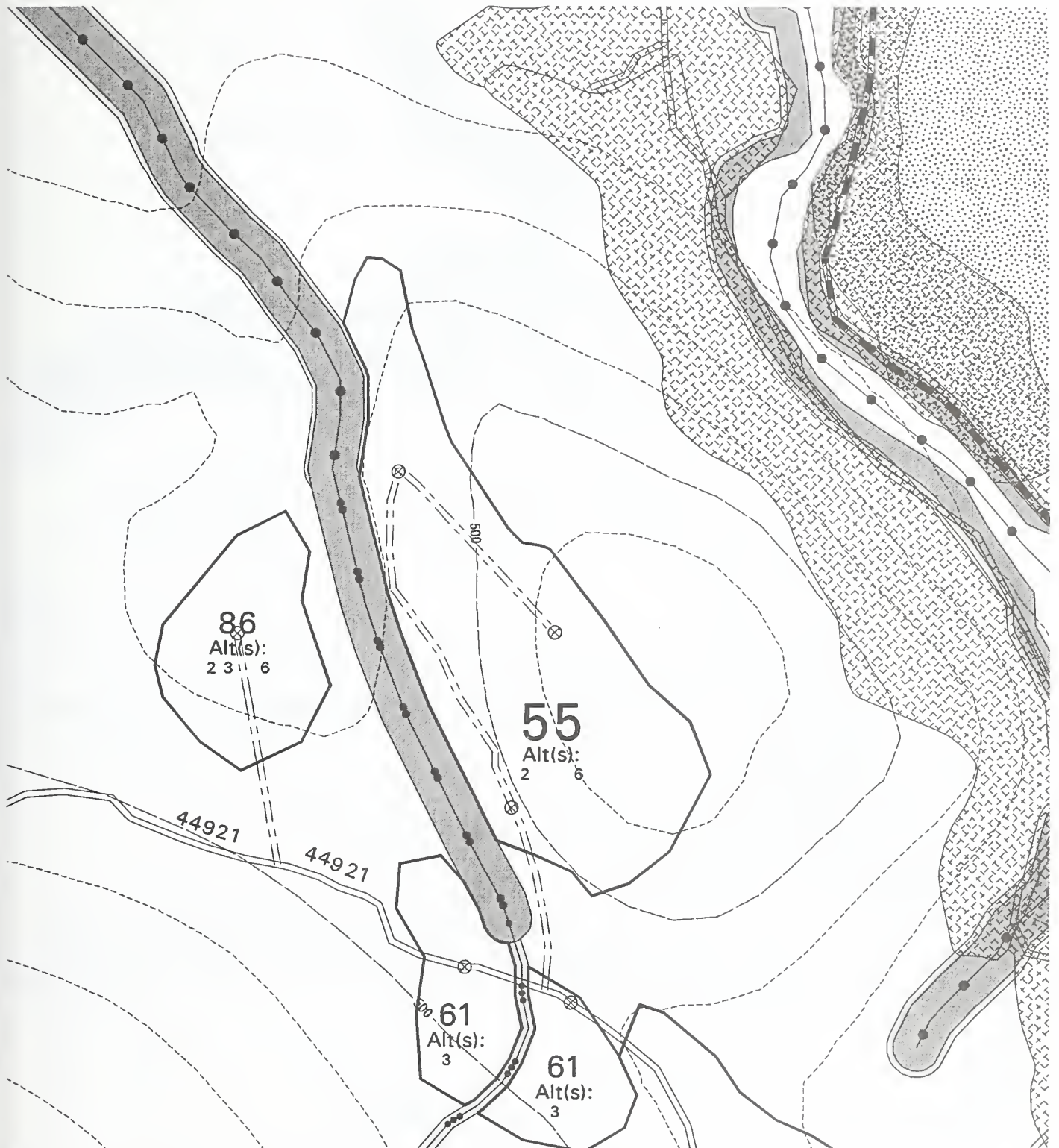
Clearcut with reserves

## **Logging System and Unit Design**

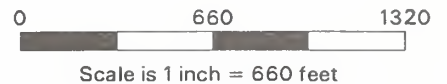
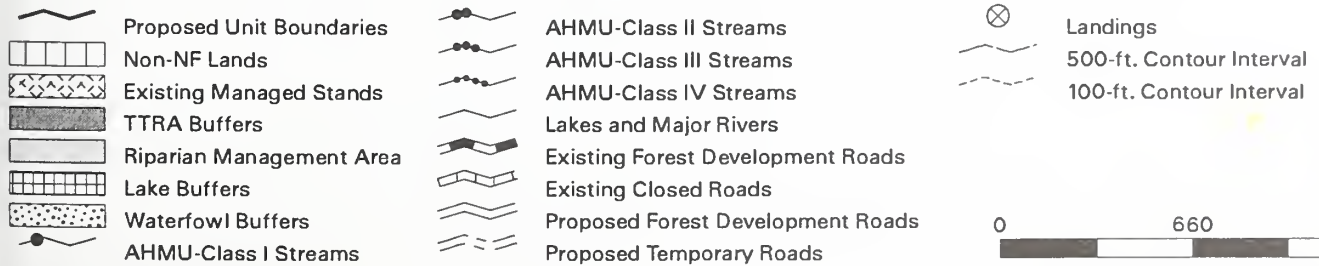
Unit is designed to border a Class II stream plus 100 foot buffer on the west boundary and border slope breaks on the other three sides. A spur road is planned to access unit with shovel and cable logging planned.



# Crystal Creek Timber Harvest Unit 55



Alternatives that include the proposed units are listed beneath the larger unit numbers.





**Crystal Creek Unit Card**  
**Unit 57**

Acres: 79      Alternative (s): 3  
1977 Aerial Photo: Flight #: 55

MBF Volume: 226  
Photo #: 174

MCF Volume: 58

## **Resource Concerns and Mitigation**

### **Fisheries**

Concern: Glacial Outwash, Class I stream channel to the west and north of the unit.

Mitigation: No commercial timber harvest within 100 feet of the channel. No commercial timber harvest in the flood plain. No programmed commercial timber harvest in the Riparian Management Area (greatest of flood plain, riparian vegetation or soils, riparian associated wetland fens, or 130 feet).

### **Hydrology**

Concern: High Gradient Contained, Class III stream channels within the unit and to the south of the unit.

Mitigation: No programmed commercial timber harvest within the Riparian Management Area defined as the V-notch (side-slope break).

### **Wildlife**

Concern: Old-growth connectivity between medium and large habitat conservation areas.

Mitigation: Provide at least a 300-foot wide corridor of old-growth forest along the Muddy River at the north border of the unit.

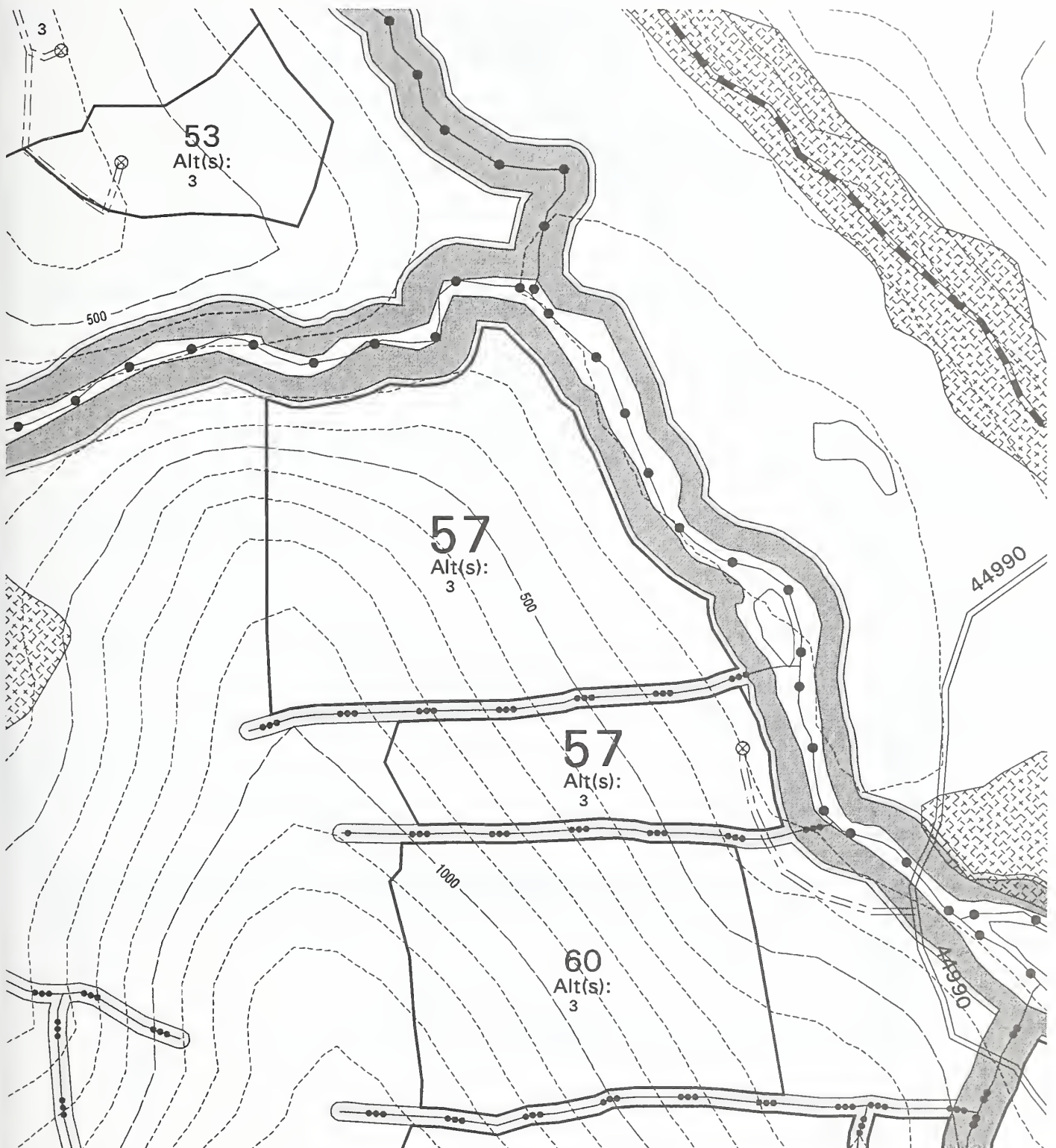
## **Silvicultural Prescription**

Group Selection - 10% removal

## **Logging System and Unit Design**

Follow slope break plus 100 feet for TTRA buffer along north and east boundary which is adjacent to Class I stream. South boundary is above v-notch Riparian Management Area and follows and follow ridge break along west boundary. Unit is planned for helicopter logging with some cable harvesting possible. A temporary road is planned to access southeast corner of unit.

# Crystal Creek Timber Harvest Unit 57



Alternatives that include the proposed units are listed beneath the larger unit numbers.



**Crystal Creek Unit Card**  
**Unit 60**

Acres: 44      Alternative (s): 3  
1977 Aerial Photo: Flight #: 55

MBF Volume: 370  
Photo #: 174

MCF Volume: 96

## **Resource Concerns and Mitigation**

### **Wildlife**

Concern: Goat kidding area to west of unit on steep mountainside on east side of Crystal Creek. Goat summer range in high-elevation muskeg/subalpine habitat southwest of unit.

Mitigation: Avoid helicopter overflights on the east side of Crystal Creek and on the ridgetop west of the unit. Limit helicopter landings used by logging crews to designated landings adjacent to the unit.

### **Hydrology**

Concern: High Gradient Contained, Class III stream channels to the north and south of the unit.

Mitigation: No programmed commercial timber harvest within the Riparian Management Area, defined as the V-notch (side-slope break).

### **Landslide Prone Soils**

Concern: Isolated areas of steep slope located in the southern portion of unit.

Mitigation: Retain some trees on steeper slopes to maintain slope stability.

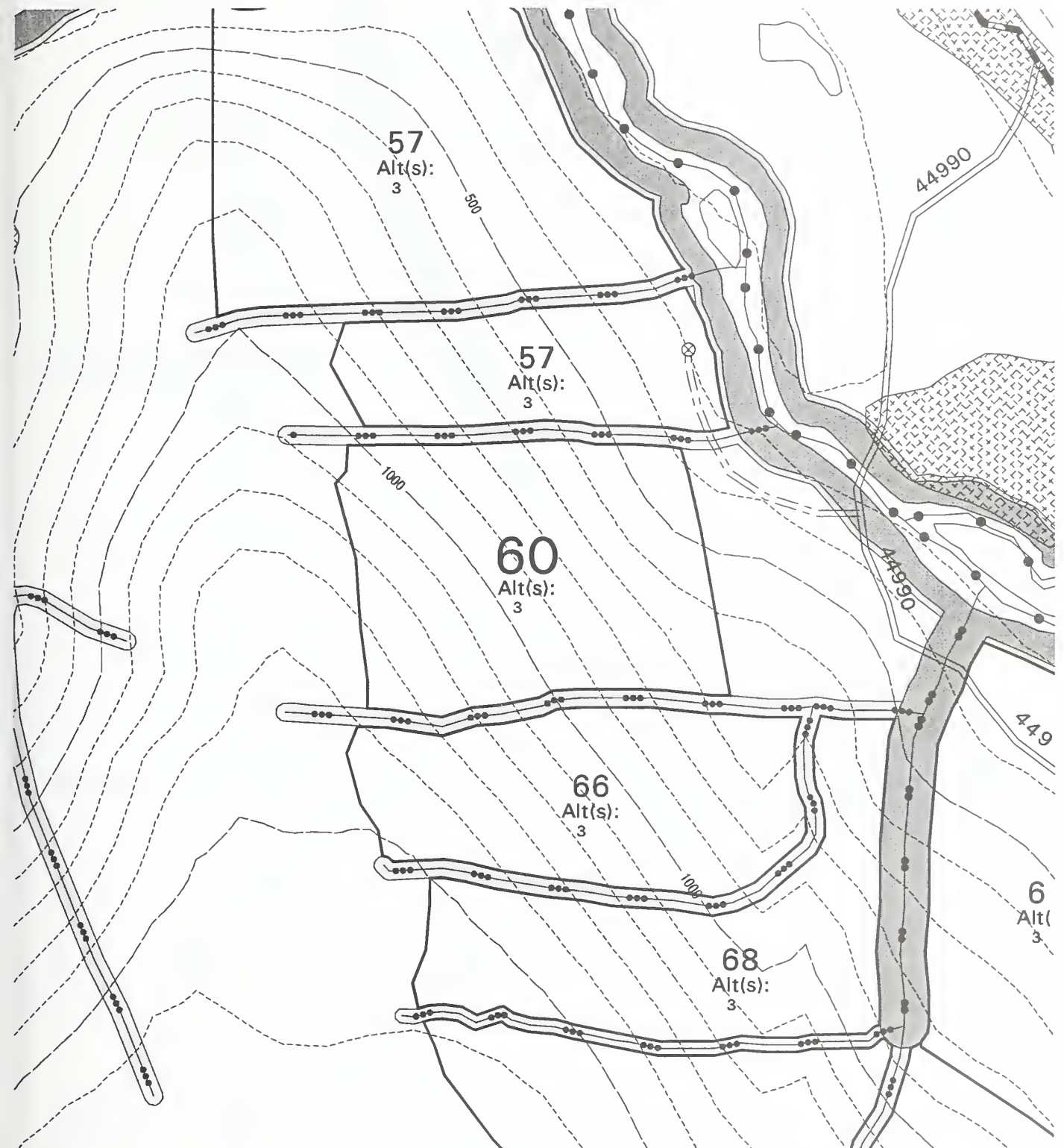
## **Silvicultural Prescription**

Group Selection - 30% removal

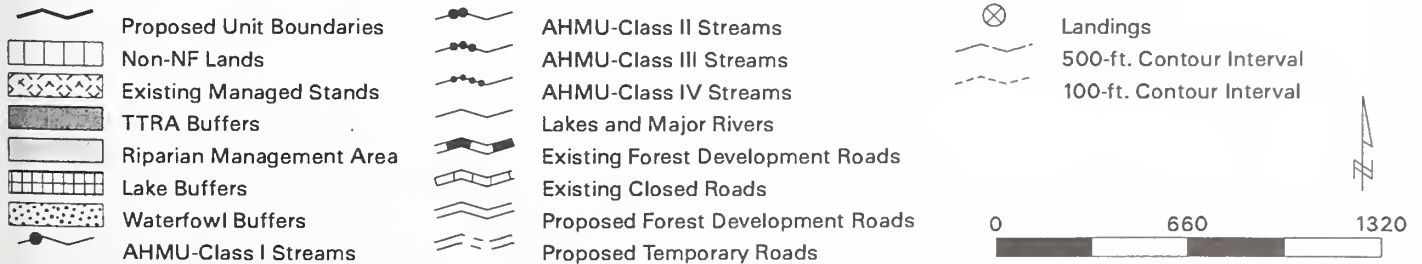
## **Logging System and Unit Design**

Unit is designed to follow slope break above Class III streams on north and south boundaries. Establish unit boundary far enough away from the slope break to prevent soil and wind disturbance. Helicopter yarding to Road 44990 is planned.

# Crystal Creek Timber Harvest Unit 60



Alternatives that include the proposed units are listed beneath the larger unit numbers.





**Crystal Creek Unit Card**  
**Unit 61**

Acres: 18      Alternative (s): 3  
1977 Aerial Photo: Flight #: 53

MBF Volume: 276  
Photo #: 100

MCF Volume : 76

## **Resource Concerns and Mitigation**

### **Fisheries**

Concern: High Gradient Contained, Class II stream channel to the north of the unit.

Mitigation: No commercial timber harvest within 100 feet of the channel. No programmed commercial timber harvest within the Riparian Management Area, defined within 100 feet of the stream or to the top of the V-notch (side-slope break), whichever is greater.

### **Hydrology**

Concern: High Gradient Contained, Class III stream channel within the unit.

Mitigation: No programmed commercial timber harvest within the Riparian Management Area, defined as the V-notch (side-slope break).

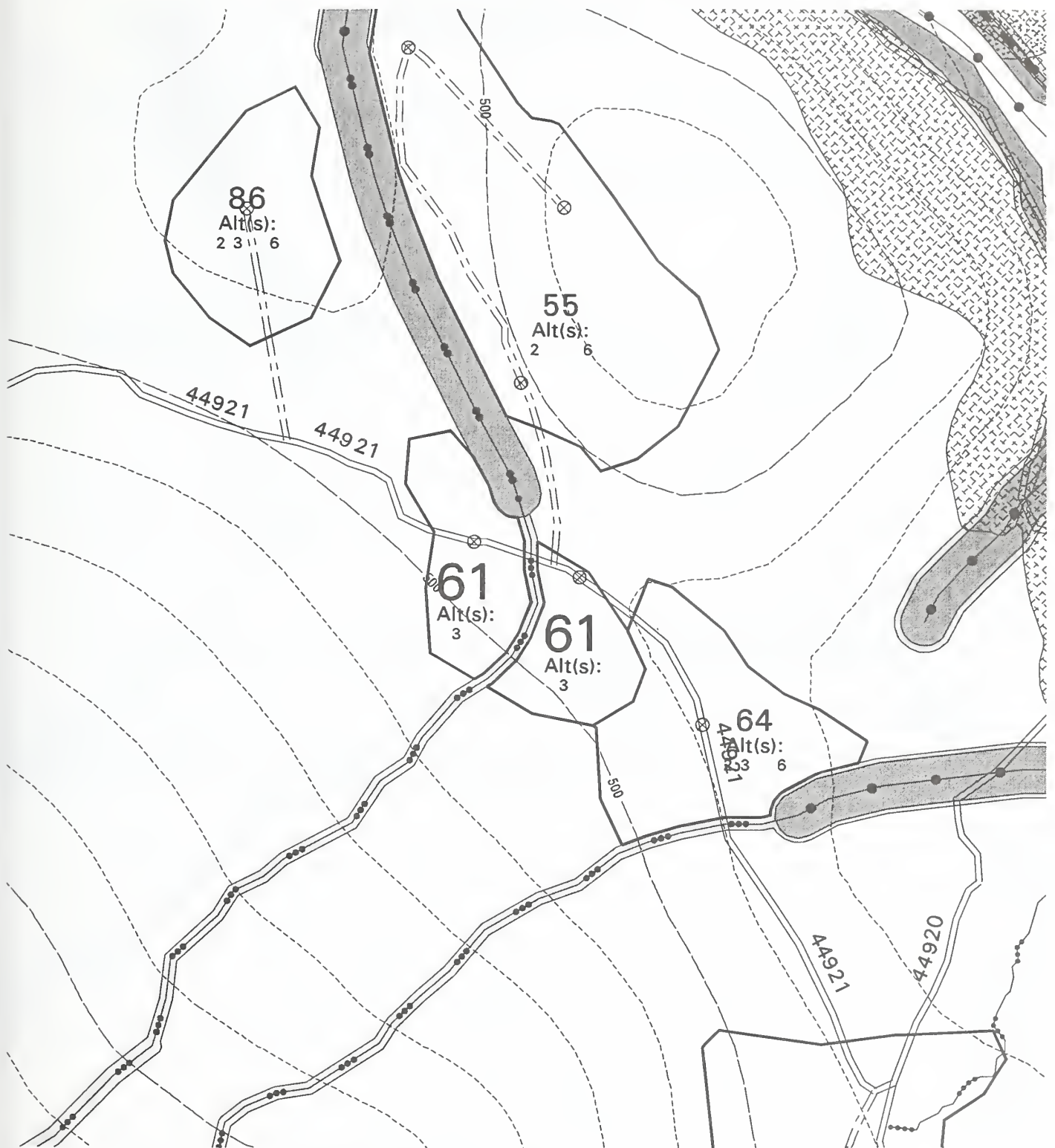
## **Silvicultural Prescription**

Clearcut with reserves. Look for opportunities to retain more than 15% of the basal area by leaving unmerchantable or large trees with low-economic value.

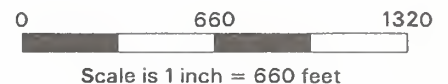
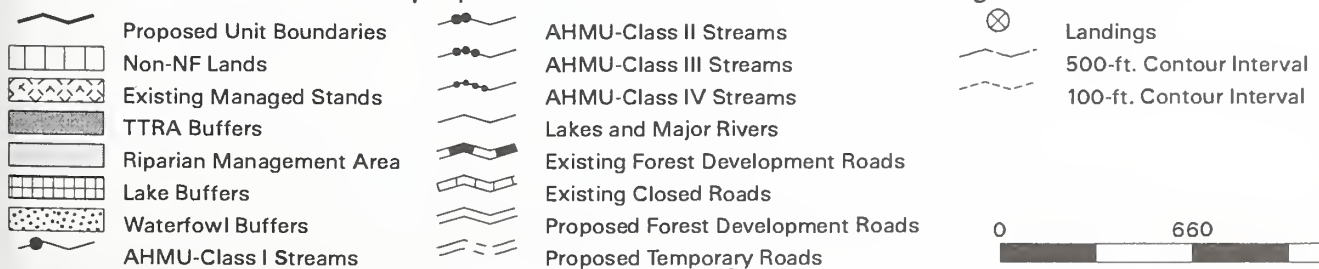
## **Logging System and Unit Design**

Unit is split by a Class III stream with Road 44920 going through the unit. Maintain adequate windfirm buffer. Unit is planned for shovel yarding.

# Crystal Creek Timber Harvest Unit 61



Alternatives that include the proposed units are listed beneath the larger unit numbers.



## **Crystal Creek Unit Card**

### **Unit 64**

Acres: 19      Alternative (s): 2, 3, and 6      MBF Volume: 428, 428, and 50      MCF Volume: 109, 109, and 13  
1977 Aerial Photo: Flight #: 53      Photo #: 100

## **Resource Concerns and Mitigation**

### **Fisheries**

Concern: Moderate Gradient/Mixed Control, Class I stream channel to the southwest of the unit.

Mitigation: No commercial timber harvest within 100 feet from the channel. No programmed commercial timber harvest in the Riparian Management Area (greatest of flood plain, riparian vegetation or soils, riparian associated wetland fens, or 120 feet).

### **Hydrology**

Concern: High Gradient Contained, Class III stream channel south the unit.

Mitigation: No programmed commercial timber harvest within the Riparian Management Area, defined as the V-notch (side-slope break).

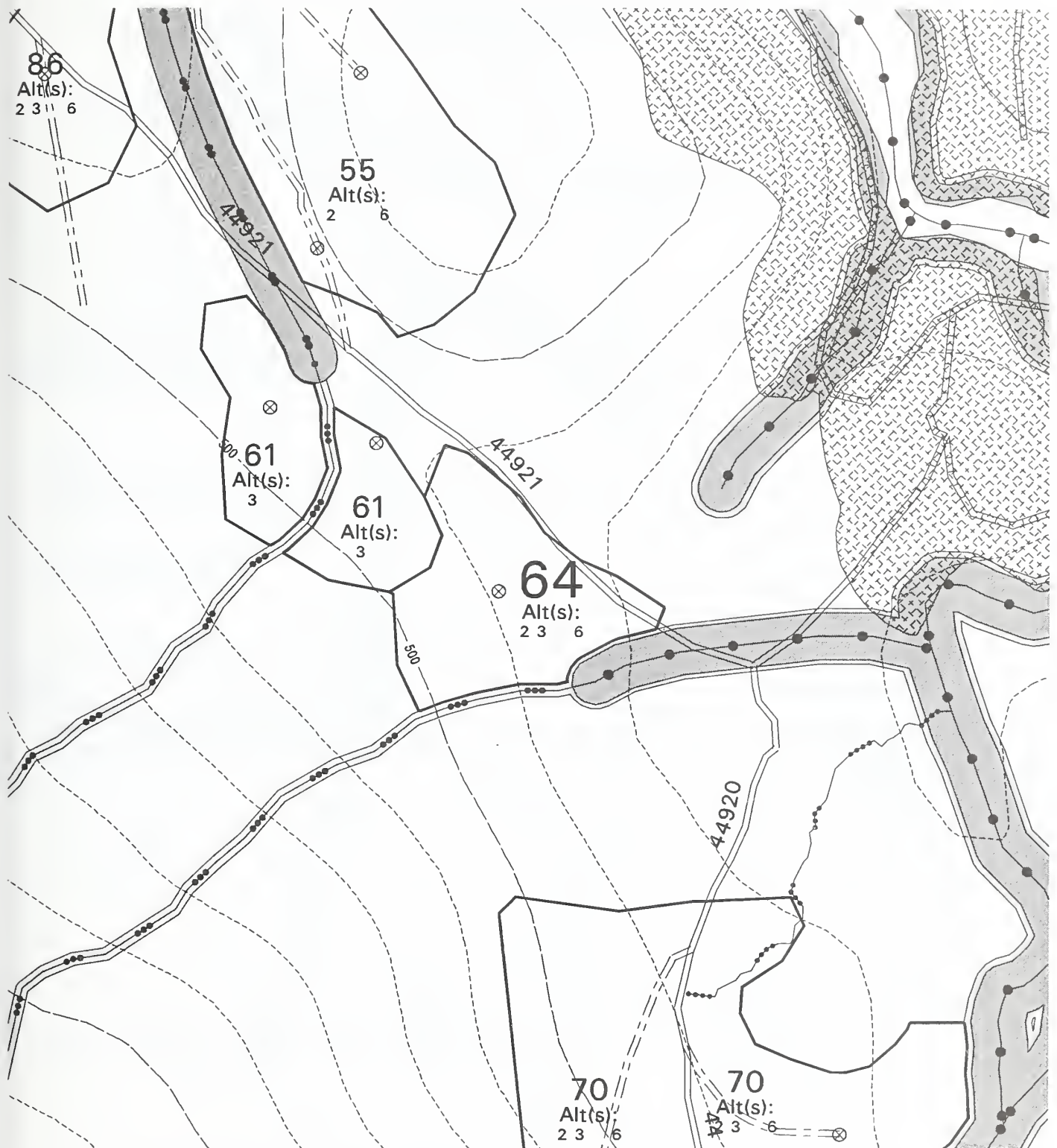
## **Silvicultural Prescription**

Clearcut with reserves. Look for opportunities to retain more than 15% of the basal area by leaving unmerchantable or large trees with low-economic value.

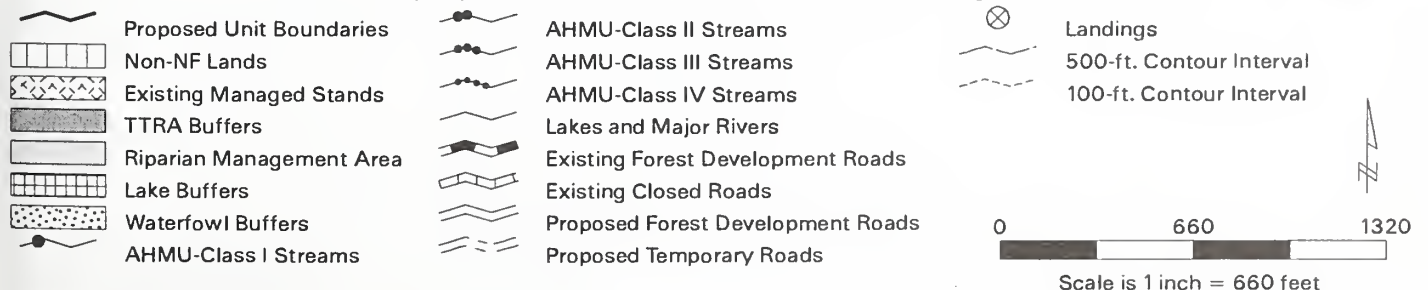
## **Logging System and Unit Design**

Unit borders Class I and III stream buffers along the south boundary and has a common boundary with Unit 61 to the northwest. Unit is planned for shovel logging to Road 44921.

# Crystal Creek Timber Harvest Unit 64



Alternatives that include the proposed units are listed beneath the larger unit numbers.





**Crystal Creek Unit Card**  
**Unit 65**

Acres: 47      Alternative (s): 3  
1977 Aerial Photo: Flight #: 55

MBF Volume: 1134  
Photo #: 174

MCF Volume: 289

## **Resource Concerns and Mitigation**

### **Fisheries**

Concern: High Gradient Contained Class II stream channels to the east and west of the unit.

Mitigation: No commercial timber harvest within 100 feet of the channel. No programmed commercial timber harvest within the Riparian Management Area, defined as within 100 feet of the stream or to the top of the V-notch (side-slope break) whichever is greater.

Concern: Glacial Outwash, Class I stream channel to the north of the unit.

Mitigation: No commercial timber harvest within 100 feet of the channel. No commercial timber harvest in the flood plain. No programmed commercial timber harvest in the Riparian Management Area (greatest of flood plain, riparian vegetation or soils, riparian associated wetland fens, or 130 feet).

### **Hydrology**

Concern: High Gradient Contained, Class III stream channel southwest of the unit.

Mitigation: No programmed commercial timber harvest within the Riparian Management Area, defined as the V-notch (side-slope break).

Concern: A blowdown patch was located on the hill slope above the Muddy River upstream (to the southeast) of this unit. Trees blew down in a downstream direction. Blowdown of stream adjacent buffers in this vicinity is possible.

Mitigation: Feather buffers along the west boundary of unit.

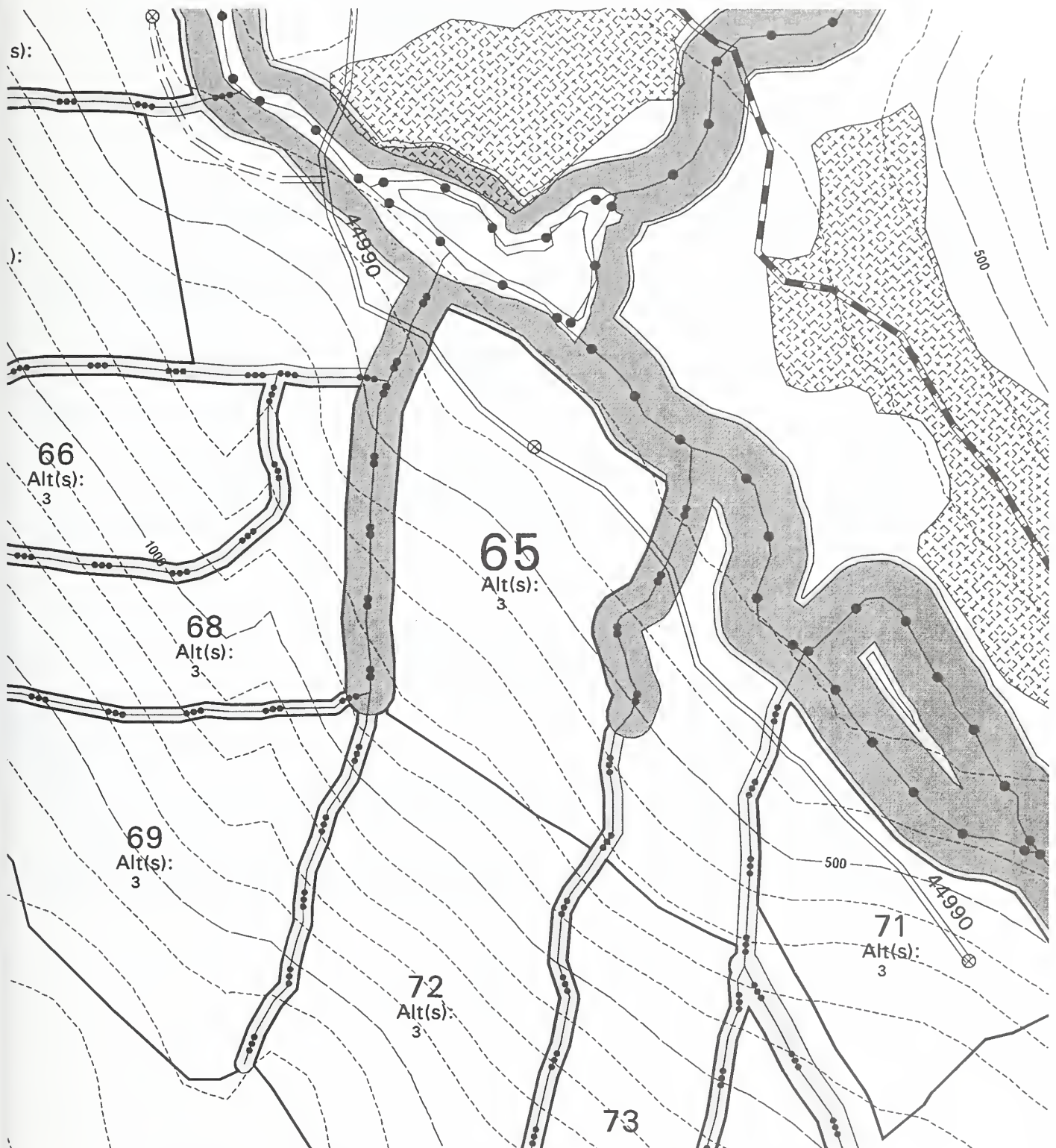
## **Silvicultural Prescription**

Clearcut with reserves

## **Logging System and Unit Design**

Unit borders Class I, II, and III stream buffers. Provide for adequate windfirm buffers. Skyline cable system is planned for timber removal.

# Crystal Creek Timber Harvest Unit 65



Alternatives that include the proposed units are listed beneath the larger unit numbers.

- |  |                          |  |                                   |  |                          |
|--|--------------------------|--|-----------------------------------|--|--------------------------|
|  | Proposed Unit Boundaries |  | AHMU-Class II Streams             |  | Landings                 |
|  | Non-NF Lands             |  | AHMU-Class III Streams            |  | 500-ft. Contour Interval |
|  | Existing Managed Stands  |  | AHMU-Class IV Streams             |  | 100-ft. Contour Interval |
|  | TTRA Buffers             |  | Lakes and Major Rivers            |  |                          |
|  | Riparian Management Area |  | Existing Forest Development Roads |  |                          |
|  | Lake Buffers             |  | Existing Closed Roads             |  |                          |
|  | Waterfowl Buffers        |  | Proposed Forest Development Roads |  |                          |
|  | AHMU-Class I Streams     |  | Proposed Temporary Roads          |  |                          |

0 660 1320  
Scale is 1 inch = 660 feet

**Crystal Creek Unit Card**  
**Unit 66**

Acres: 34      Alternative (s): 3  
1977 Aerial Photo: Flight #: 55

MBF Volume: 267  
Photo #: 174

MCF Volume : 70

## **Resource Concerns and Mitigation**

### **Wildlife**

Concern: Goat kidding area to west of unit on steep mountainside on east side of Crystal Creek. Goat summer range in high-elevation muskeg/subalpine habitat southwest of unit.

Mitigation: Avoid helicopter overflights on the east side of Crystal Creek and on the ridgetop west of the unit. Limit helicopter landings used by logging crews to designated landings adjacent to the units.

### **Hydrology**

Concern: High Gradient Contained, Class III stream channels north and south of the unit.

Mitigation: No programmed commercial timber harvest within the Riparian Management Area, defined as the V-notch (side-slope break).

### **Landslide Prone Soils**

Concern: Isolated areas of steep slope located in the eastern portion of unit.

Mitigation: Retain some trees on unstable terrain to maintain slope stability.

## **Silvicultural Prescription**

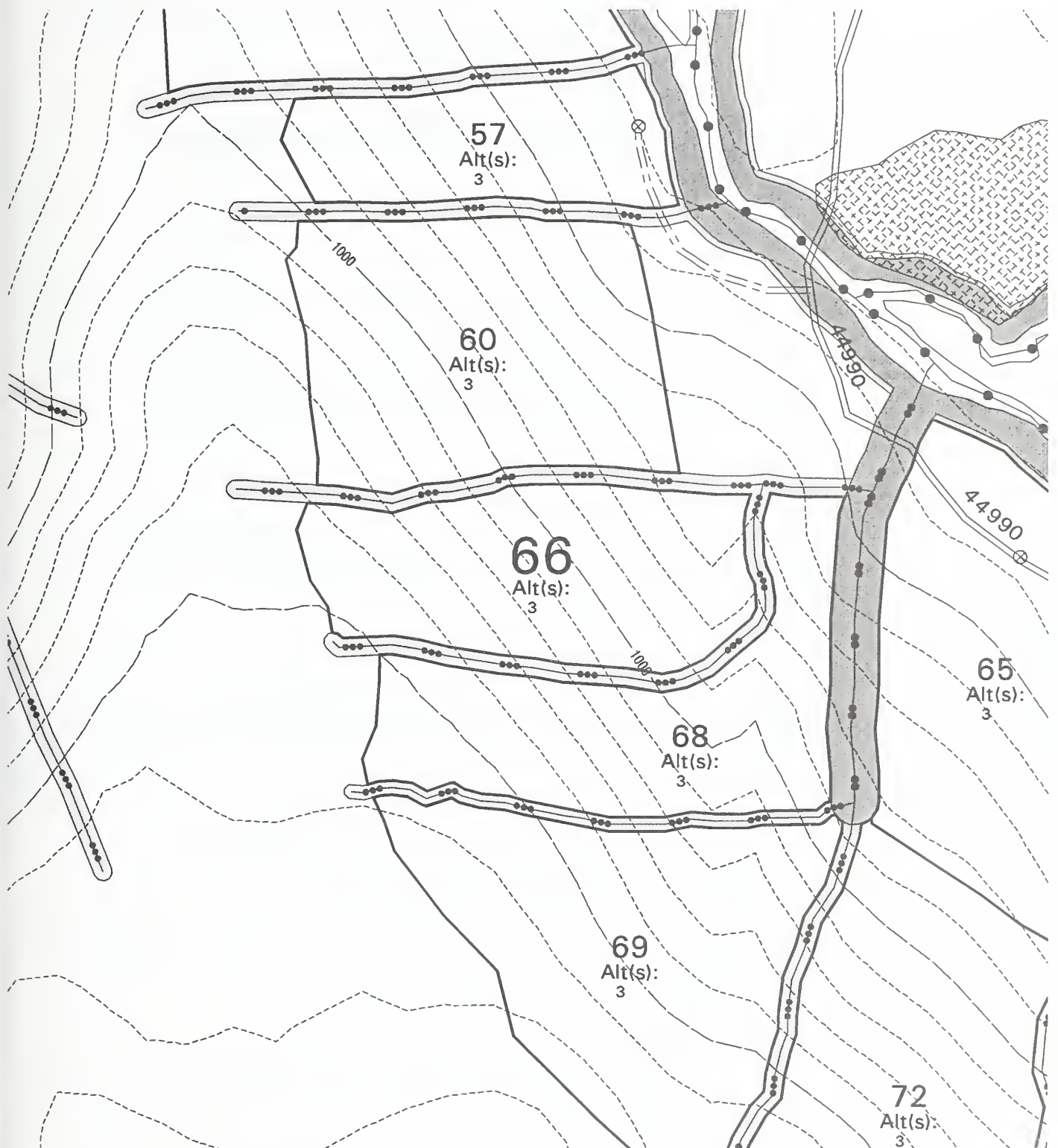
Group Selection - 30% removal

## **Logging System and Unit Design**

Maintain wind-firm boundaries along Class III streams. Helicopter logging is planned with yarding to a landing in Unit 65.



# Crystal Creek Timber Harvest Unit 66

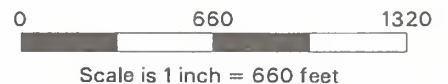


Alternatives that include the proposed units are listed beneath the larger unit numbers.

- Proposed Unit Boundaries
- Non-NF Lands
- Existing Managed Stands
- TTRA Buffers
- Riparian Management Area
- Lake Buffers
- Waterfowl Buffers
- AHMU-Class I Streams

- AHMU-Class II Streams
- AHMU-Class III Streams
- AHMU-Class IV Streams
- Lakes and Major Rivers
- Existing Forest Development Roads
- Existing Closed Roads
- Proposed Forest Development Roads
- Proposed Temporary Roads

- Landings
- 500-ft. Contour Interval
- 100-ft. Contour Interval





## **Crystal Creek Unit Card**

### **Unit 68**

Acres: 35      Alternative (s): 3  
1977 Aerial Photo: Flight #: 55

MBF Volume: 284  
Photo #: 174

MCF Volume: 75

## **Resource Concerns and Mitigation**

### **Wildlife**

Concern: Goat kidding area to west of unit on steep mountainside on east side of Crystal Creek. Goat summer range in high-elevation muskeg/subalpine habitat southwest of unit.

Mitigation: Avoid helicopter overflights on the east side of Crystal Creek and on the ridgetop west of the unit. Limit helicopter landings used by logging crews to designated landings adjacent to the units.

### **Fisheries**

Concern: High Gradient Contained Class II stream channel to the east of the unit.

Mitigation: No commercial timber harvest within 100 feet of the channel. No programmed commercial timber harvest within the Riparian Management Area, defined as within 100 feet of the stream or to the top of the V-notch (side-slope break) whichever is greater.

### **Hydrology**

Concern: High Gradient Contained, Class III stream channel north and south of the unit.

Mitigation: No programmed commercial timber harvest within the Riparian Management Area, defined as the V-notch (side-slope break).

### **Landslide Prone Soils**

Concern: Isolated areas of steep slope located in portions of the western two thirds of the unit.

Mitigation: Retain some trees on unstable terrain to maintain slope stability.

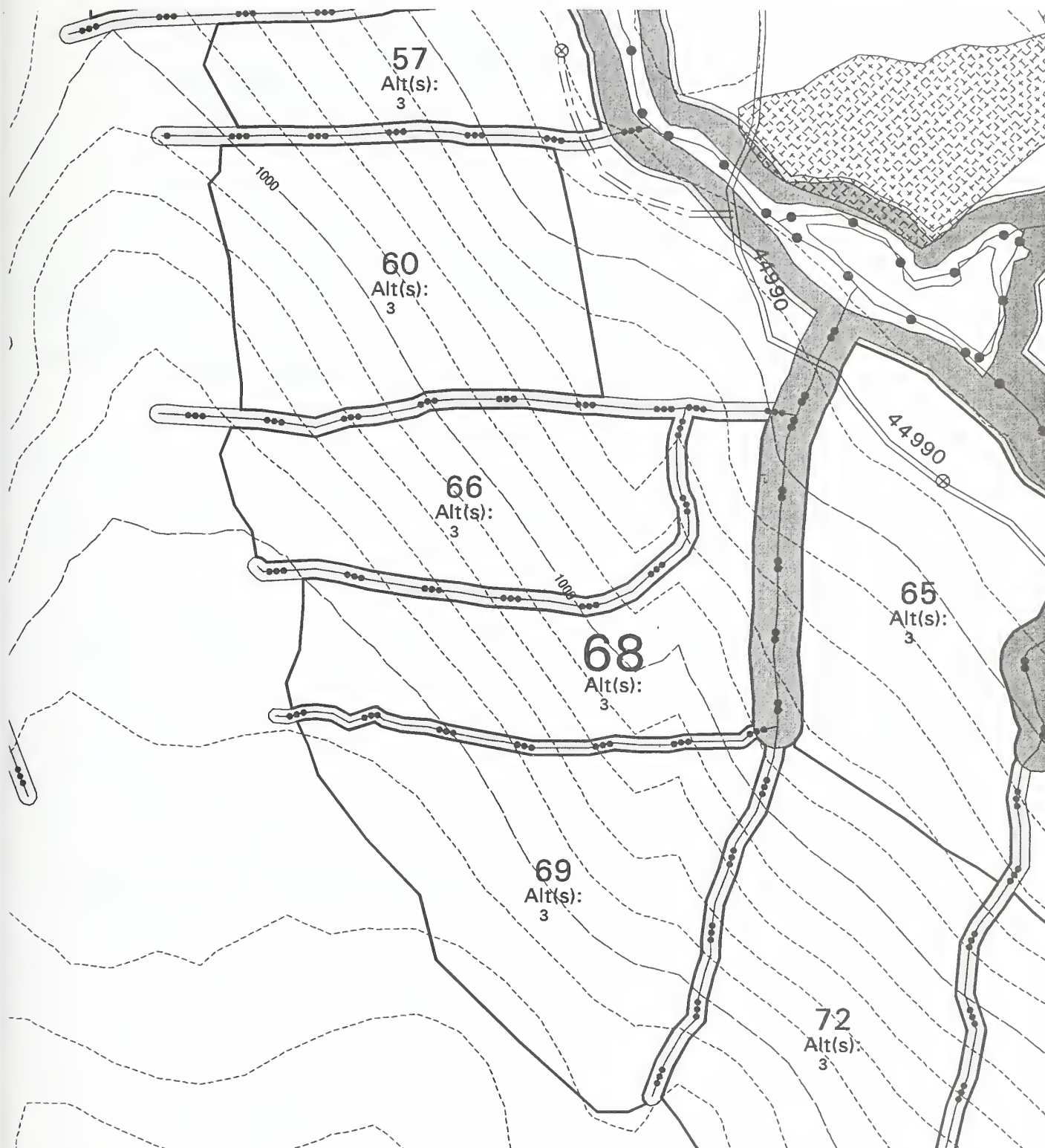
## **Silvicultural Prescription**

Group Selection - 30% removal

## **Logging System and Unit Design**

Follow Class II and III stream buffers for unit boundaries. Maintain adequate windfirm buffers. Unit is planned for helicopter logging using landings in Unit 65.

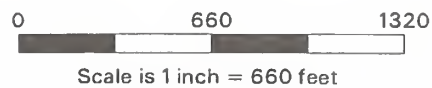
# Crystal Creek Timber Harvest Unit 68



Alternatives that include the proposed units are listed beneath the larger unit numbers.

- |  |                          |  |                                   |
|--|--------------------------|--|-----------------------------------|
|  | Proposed Unit Boundaries |  | AHMU-Class II Streams             |
|  | Non-NF Lands             |  | AHMU-Class III Streams            |
|  | Existing Managed Stands  |  | AHMU-Class IV Streams             |
|  | TTRA Buffers             |  | Lakes and Major Rivers            |
|  | Riparian Management Area |  | Existing Forest Development Roads |
|  | Lake Buffers             |  | Existing Closed Roads             |
|  | Waterfowl Buffers        |  | Proposed Forest Development Roads |
|  | AHMU-Class I Streams     |  | Proposed Temporary Roads          |

- |  |                          |
|--|--------------------------|
|  | Landings                 |
|  | 500-ft. Contour Interval |
|  | 100-ft. Contour Interval |



**Crystal Creek Unit Card**  
**Unit 69**

Acres: 49      Alternative (s): 3  
1977 Aerial Photo: Flight #: 55

MBF Volume: 374  
Photo #: 174

MCF Volume : 99

## **Resource Concerns and Mitigation**

### **Wildlife**

Concern: Goat kidding area to west of unit on steep mountainside on east side of Crystal Creek. Goat summer range in high-elevation muskeg/subalpine habitat southwest of unit.

Mitigation: Avoid helicopter overflights on the east side of Crystal Creek and on the ridgetop west of the unit. Limit helicopter landings used by logging crews to designated landings adjacent to the units.

### **Hydrology**

Concern: High Gradient Contained, Class III stream channel north and east of the unit.

Mitigation: No programmed commercial timber harvest within the Riparian Management Area, defined as the V-notch (side-slope break).

### **Landslide Prone Soils**

Concern: Isolated areas of steep slope located in portions of the eastern two-thirds of unit.

Mitigation: Retain some trees on unstable terrain to maintain slope stability.

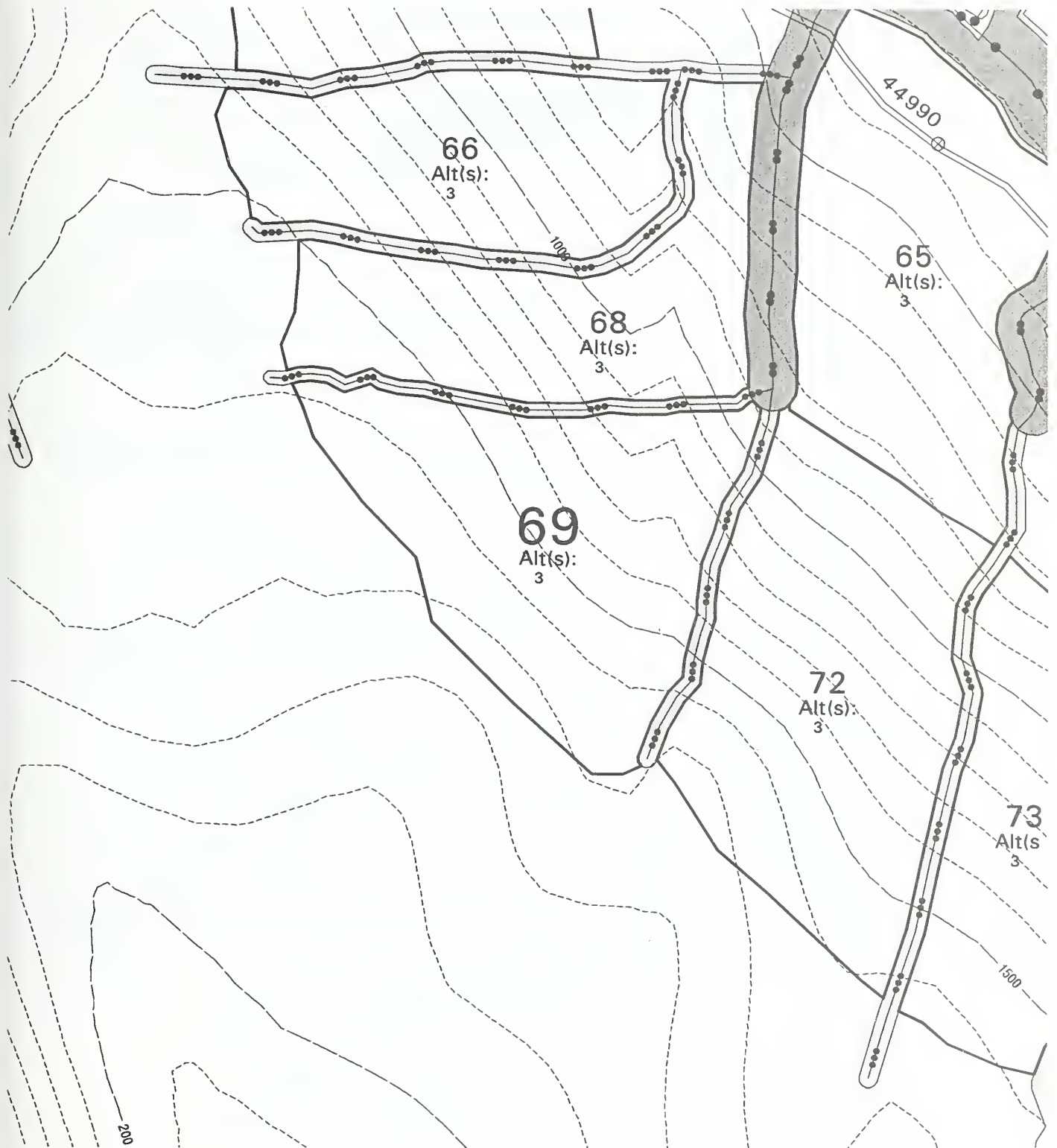
## **Silvicultural Prescription**

Group Selection - 30% removal

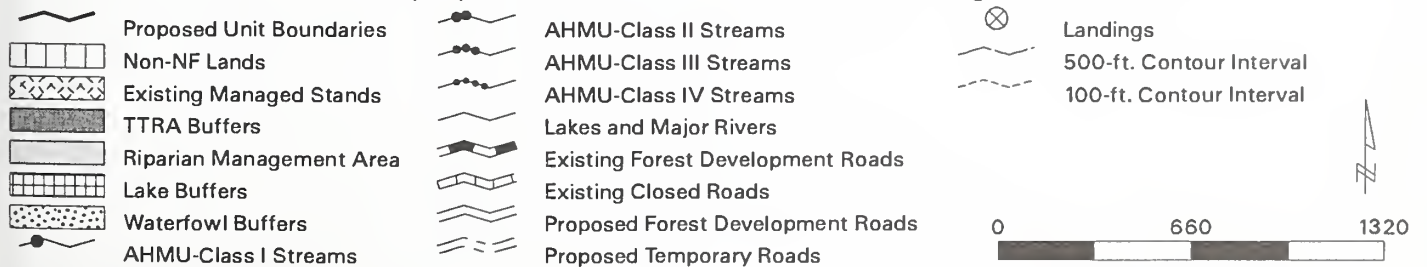
## **Logging System and Unit Design**

Maintain wind-firm boundaries along Class III streams to the north and south. Unit is planned for helicopter logging utilizing landings in Unit 65.

# Crystal Creek Timber Harvest Unit 69



Alternatives that include the proposed units are listed beneath the larger unit numbers.





**Crystal Creek Unit Card**  
**Unit 70**

Acres: 57      Alternative (s): 2, 3, 6   MBF Volume: 1405, 1405, 165   MCF Volume :357, 357, 42  
1977 Aerial Photo: Flight #: 53      Photo #: 101

**Resource Concerns and Mitigation**

**Fisheries**

Concern: Moderate Gradient/Mixed Control, Class I stream channel east of the unit.

Mitigation: No commercial timber harvest within 100 feet of Class I stream channel. No programmed commercial timber harvest in the Riparian Management Area (greatest of flood plain, riparian vegetation or soil, riparian associated wetland fens, or 120 feet).

Concern: High Gradient Contained Class II stream channel to the south of the unit.

Mitigation: No commercial timber harvest within 100 feet of the channel. No programmed commercial timber harvest within the Riparian Management Area, defined as within 100 feet of the stream or to the top of the V-notch (side-slope break) whichever is greater.

**Hydrology**

Concern: High Gradient Contained, Class III stream channels to the north and south of the unit.

Mitigation: No programmed commercial timber harvest within the Riparian Management Area, defined as the V-notch (side-slope break).

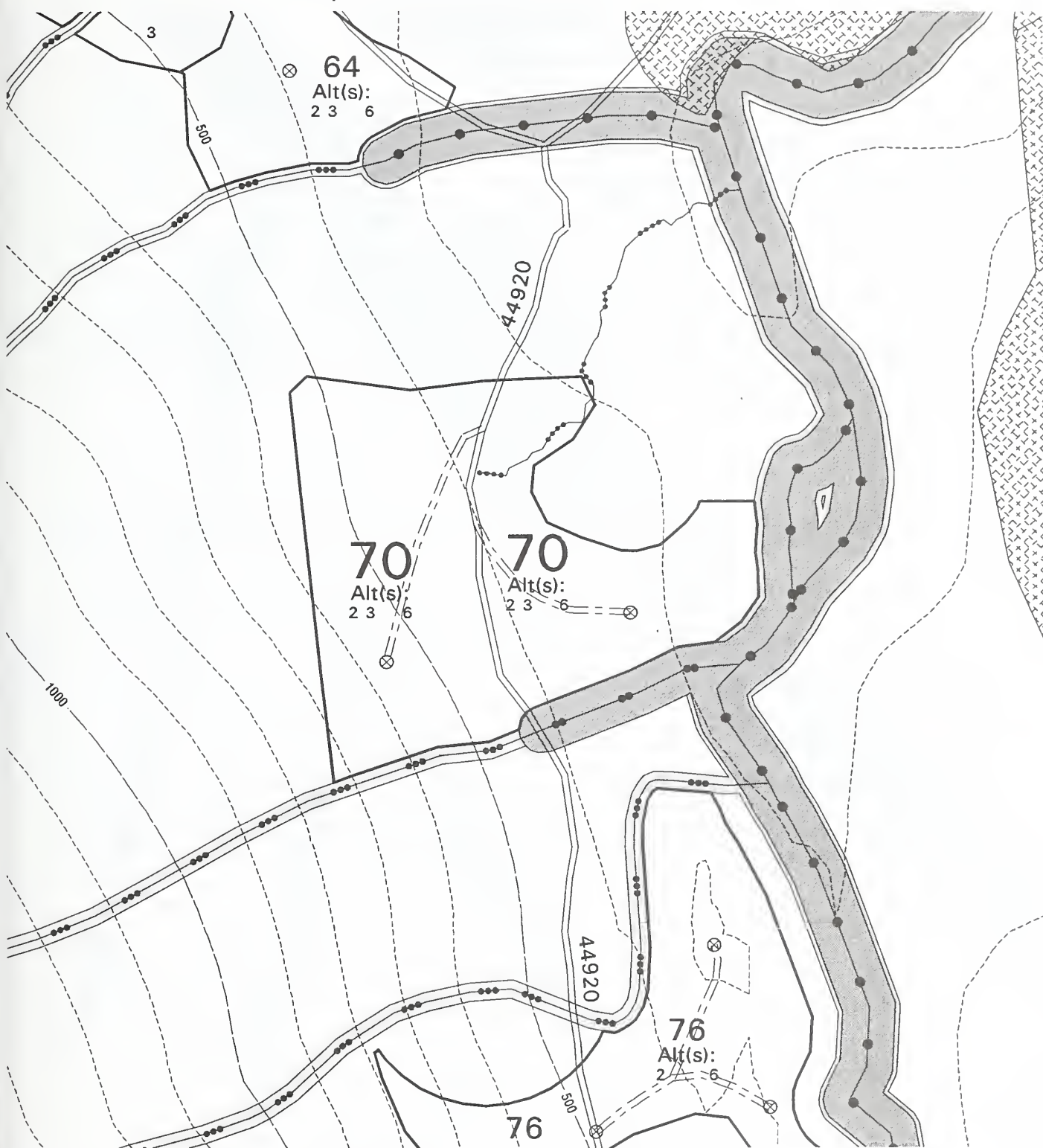
**Silvicultural Prescription**

Clearcut with reserves west of Forest Road 44920  
Group selection 30% removal below Forest Road 44920

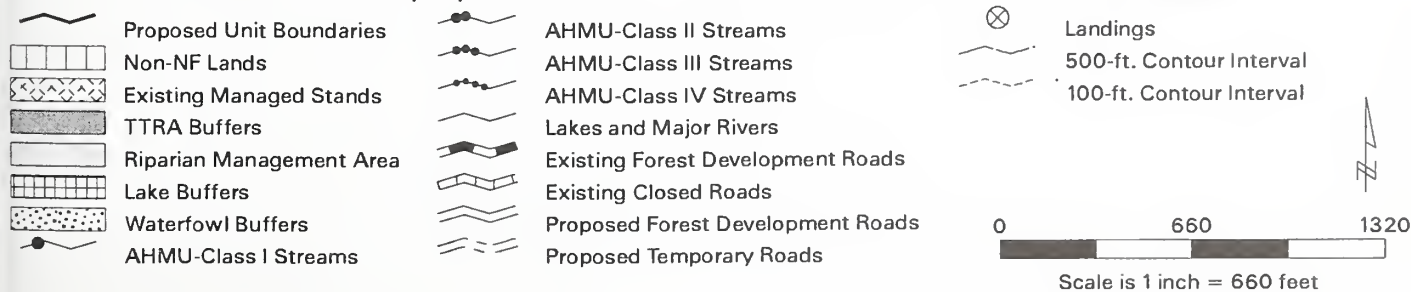
**Logging System and Unit Design**

South boundary is planned to follow Class II and III streams; provide adequate windfirm buffers. The northeast corner borders on a muskeg. The west boundary follows logical yarding boundaries. Combination of shovel and cable logging below Road 44920 and cable yarding above road is planned.

# Crystal Creek Timber Harvest Unit 70



Alternatives that include the proposed units are listed beneath the larger unit numbers.



**Crystal Creek Unit Card**  
**Unit 71**

Acres: 31      Alternative (s): 3  
1977 Aerial Photo: Flight #: 55

MBF Volume: 764  
Photo #: 173

MCF Volume: 195

## **Resource Concerns and Mitigation**

### **Fisheries**

Concern: Glacial Outwash, Class I stream channel to the northeast of the unit.

Mitigation: No commercial timber harvest within 100 feet of the channel. No commercial timber harvest in the flood plain. No programmed commercial timber harvest in the Riparian Management Area (greatest of flood plain, riparian vegetation or soils, riparian associated wetland fens, or 130 feet).

### **Hydrology**

Concern: High Gradient Contained, Class III stream channels to the west of the unit.

Mitigation: No programmed commercial timber harvest within the Riparian Management Area, defined as the V-notch (side-slope break).

Concern: Strong down stream winds suspected since unit is second growth created by previous blowdown.

Mitigation: Feather buffer along the east boundary of Class III stream.

## **Silvicultural Prescription**

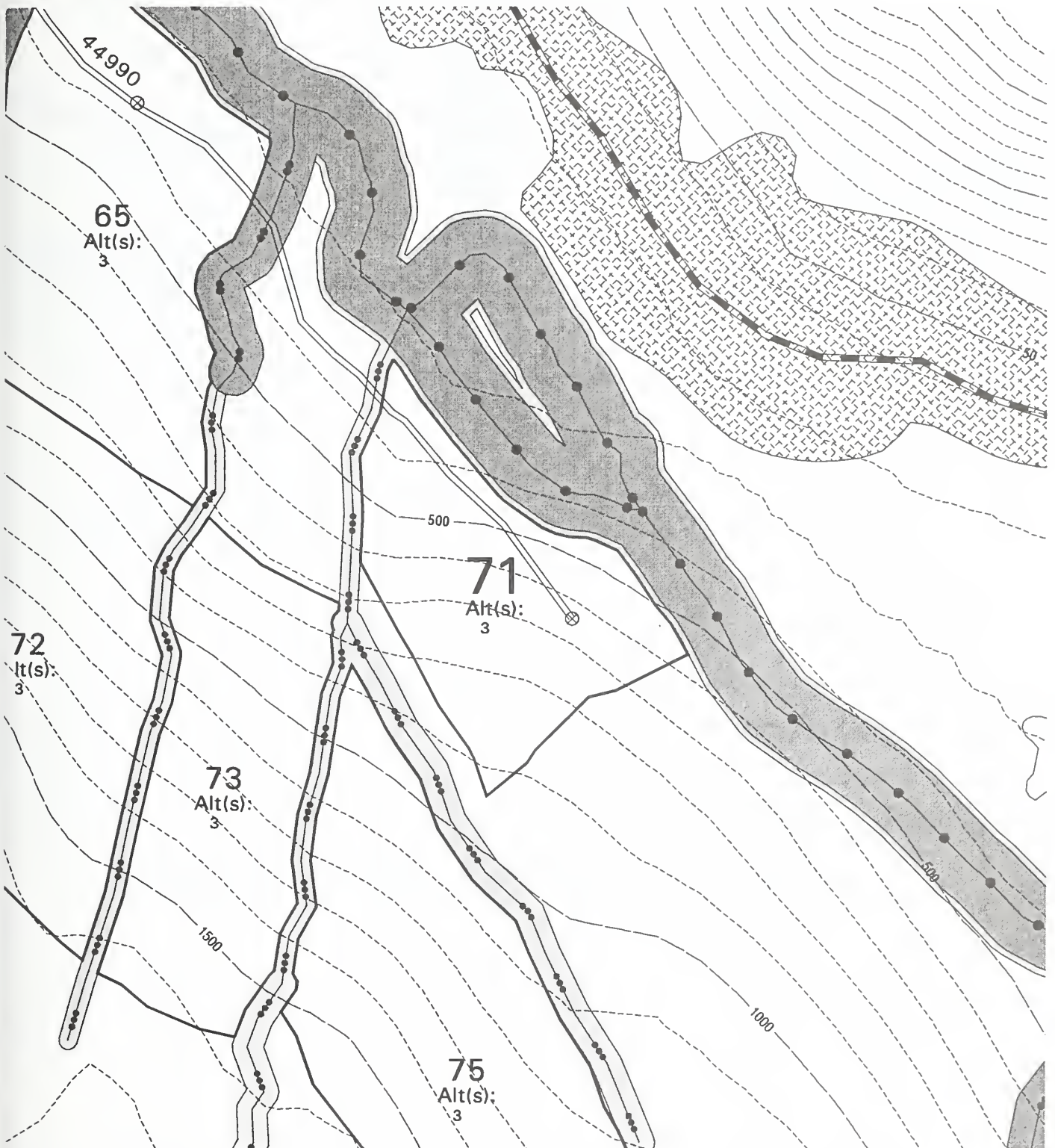
Clearcut with reserves

## **Logging System and Unit Design**

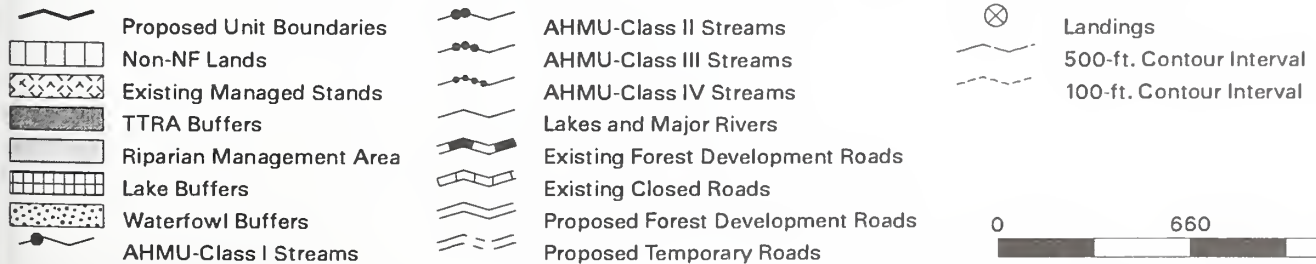
Unit boundaries are planned to follow Class I and III stream buffers providing for adequate windfirm buffers. Cable logging is planned.



# Crystal Creek Timber Harvest Unit 71



Alternatives that include the proposed units are listed beneath the larger unit numbers.



0 660 1320

Scale is 1 inch = 660 feet



**Crystal Creek Unit Card**  
**Unit 72**

Acres: 55      Alternative (s): 3  
1977 Aerial Photo: Flight #: 55

MBF Volume: 454  
Photo #: 173

MCF Volume: 118

## **Resource Concerns and Mitigation**

### **Wildlife**

Concern: Goat kidding area to west of unit on steep mountainside on east side of Crystal Creek. Goat summer range in high-elevation muskeg/subalpine habitat southwest of unit.

Mitigation: Avoid helicopter overflights on the east side of Crystal Creek and on the ridgetop west of the unit. Limit helicopter landings used by logging crews to designated landings adjacent to the units.

### **Hydrology**

Concern: High Gradient Contained, Class III stream channels to the west and east of the unit.

Mitigation: No programmed commercial timber harvest within the Riparian Management Area, defined as the V-notch (side-slope break).

### **Landslide Prone Soils**

Concern: Isolated areas of steep slope located in central portion of unit.

Mitigation: Retain some trees on steeper slopes to maintain slope stability.

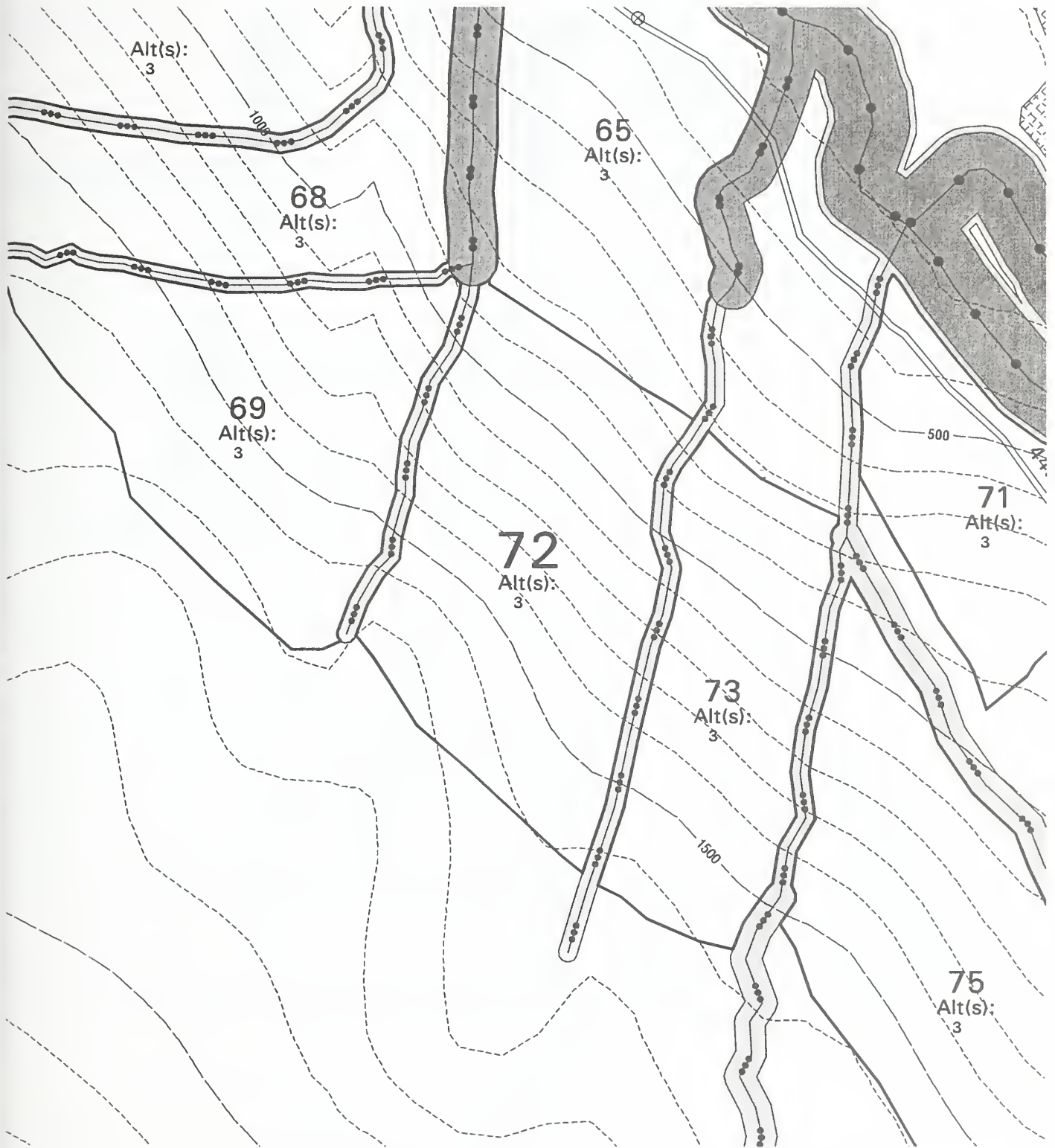
## **Silvicultural Prescription**

Group Selection - 30% removal

## **Logging System and Unit Design**

Provide for adequate windfirm buffers along Class III streams to the east and west. Unit is planned for helicopter logging utilizing landings in Unit 65.

# Crystal Creek Timber Harvest Unit 72



Alternatives that include the proposed units are listed beneath the larger unit numbers.

- |  |                          |  |                                   |
|--|--------------------------|--|-----------------------------------|
|  | Proposed Unit Boundaries |  | AHMU-Class II Streams             |
|  | Non-NF Lands             |  | AHMU-Class III Streams            |
|  | Existing Managed Stands  |  | AHMU-Class IV Streams             |
|  | TTRA Buffers             |  | Lakes and Major Rivers            |
|  | Riparian Management Area |  | Existing Forest Development Roads |
|  | Lake Buffers             |  | Existing Closed Roads             |
|  | Waterfowl Buffers        |  | Proposed Forest Development Roads |
|  | AHMU-Class I Streams     |  | Proposed Temporary Roads          |

- |  |                          |
|--|--------------------------|
|  | Landings                 |
|  | 500-ft. Contour Interval |
|  | 100-ft. Contour Interval |

0 660 1320

Scale is 1 inch = 660 feet

**Crystal Creek Unit Card**  
**Unit 73**

Acres: 35      Alternative (s): 3      MBF Volume: 833      MCF Volume : 217  
1977 Aerial Photo: Flight #: 55      Photo #: 173

## **Resource Concerns and Mitigation**

### **Wildlife**

Concern: Goat kidding area to west of unit on steep mountainside on east side of Crystal Creek. Goat summer range in high-elevation muskeg/subalpine habitat southwest of unit.

Mitigation: Avoid helicopter overflights on the east side of Crystal Creek and on the ridgetop west of the unit. Limit helicopter landings used by logging crews to designated landings adjacent to the units.

### **Hydrology**

Concern: High Gradient Contained, Class III stream channels to the west and east of the unit.

Mitigation: No programmed commercial timber harvest within the Riparian Management Area, defined as the V-notch (side-slope break).

Concern: Observed blowdown in the area.

Mitigation: Feather class III stream buffer along west boundary.

### **Landslide Prone Soils**

Concern: Isolated areas of steep slope located in central portion of unit.

Mitigation: Retain some trees on steeper slopes to maintain slope stability.

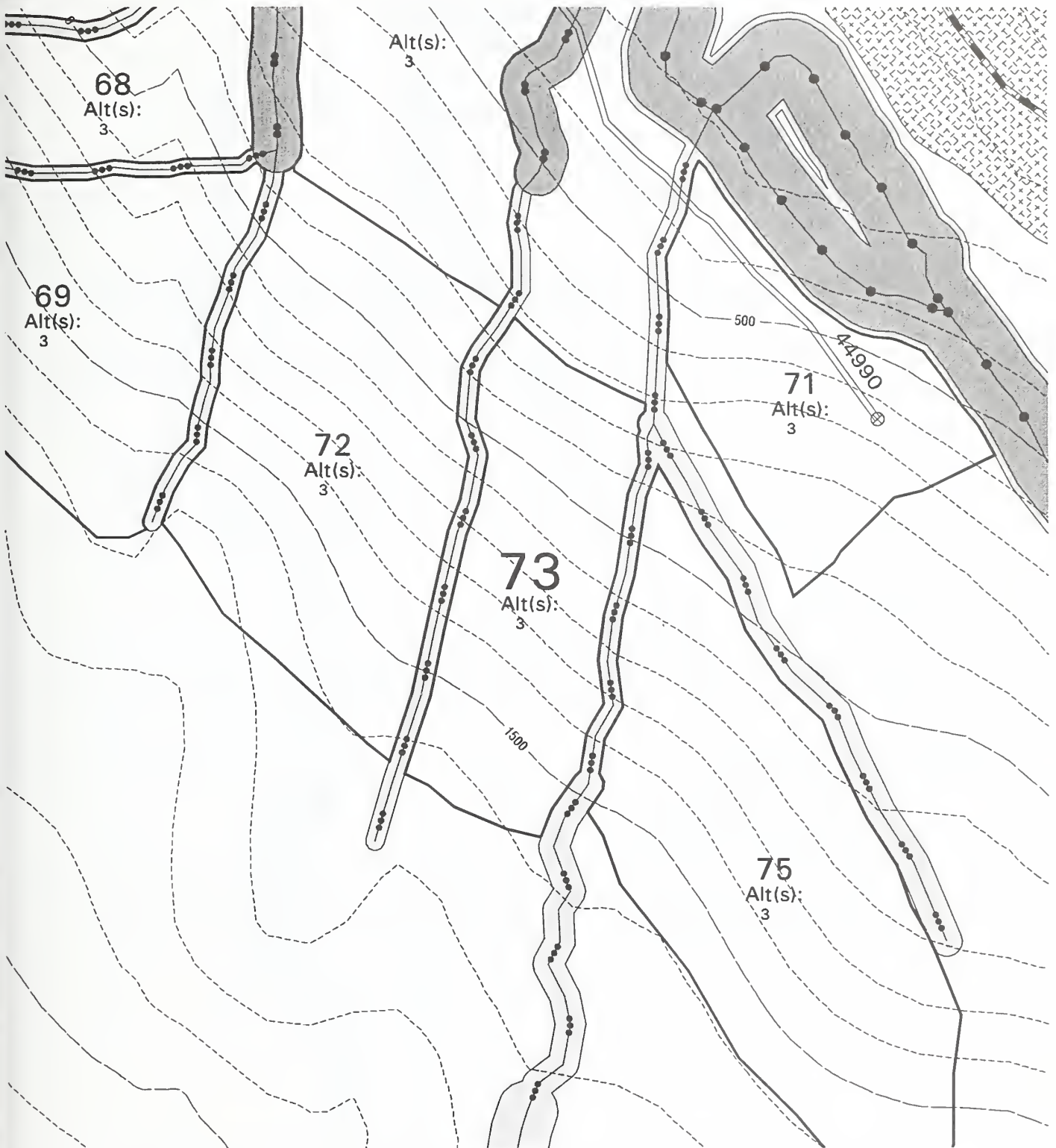
## **Silvicultural Prescription**

Clearcut with reserves. Look for opportunities to retain more than 15% of the basal area by leaving unmerchantable or large trees with low-economic value.

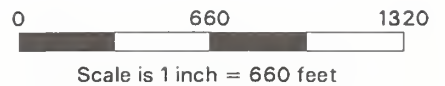
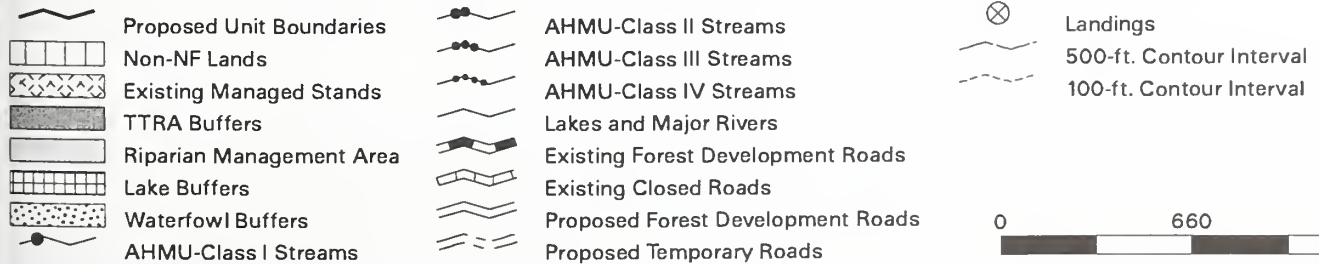
## **Logging System and Unit Design**

Provide for adequate windfirm buffers along Class III streams to the east and west. Unit is planned for helicopter logging utilizing landings in Unit 65.

# Crystal Creek Timber Harvest Unit 73



Alternatives that include the proposed units are listed beneath the larger unit numbers.





**Crystal Creek Unit Card**  
**Unit 75**

Acres: 65      Alternative (s): 3  
1977 Aerial Photo: Flight #: 55

MBF Volume: 566  
Photo #: 172

MCF Volume : 144

## **Resource Concerns and Mitigation**

### **Wildlife**

Concern: Goat kidding area to west of unit on steep mountainside on east side of Crystal Creek. Goat summer range in high-elevation muskeg/subalpine habitat southwest of unit.

Mitigation: Avoid helicopter overflights on the east side of Crystal Creek and on the ridgetop west of the unit. Limit helicopter landings used by logging crews to designated landings adjacent to the units.

### **Hydrology**

Concern: High Gradient Contained, Class III stream channels to the northeast and northwest of the unit.

Mitigation: No programmed commercial timber harvest within the Riparian Management Area, defined as the V-notch (side-slope break).

### **Landslide Prone Soils**

Concern: A few locations within the unit contain steep slopes.

Mitigation: Retain some trees on steeper slopes to maintain slope stability.

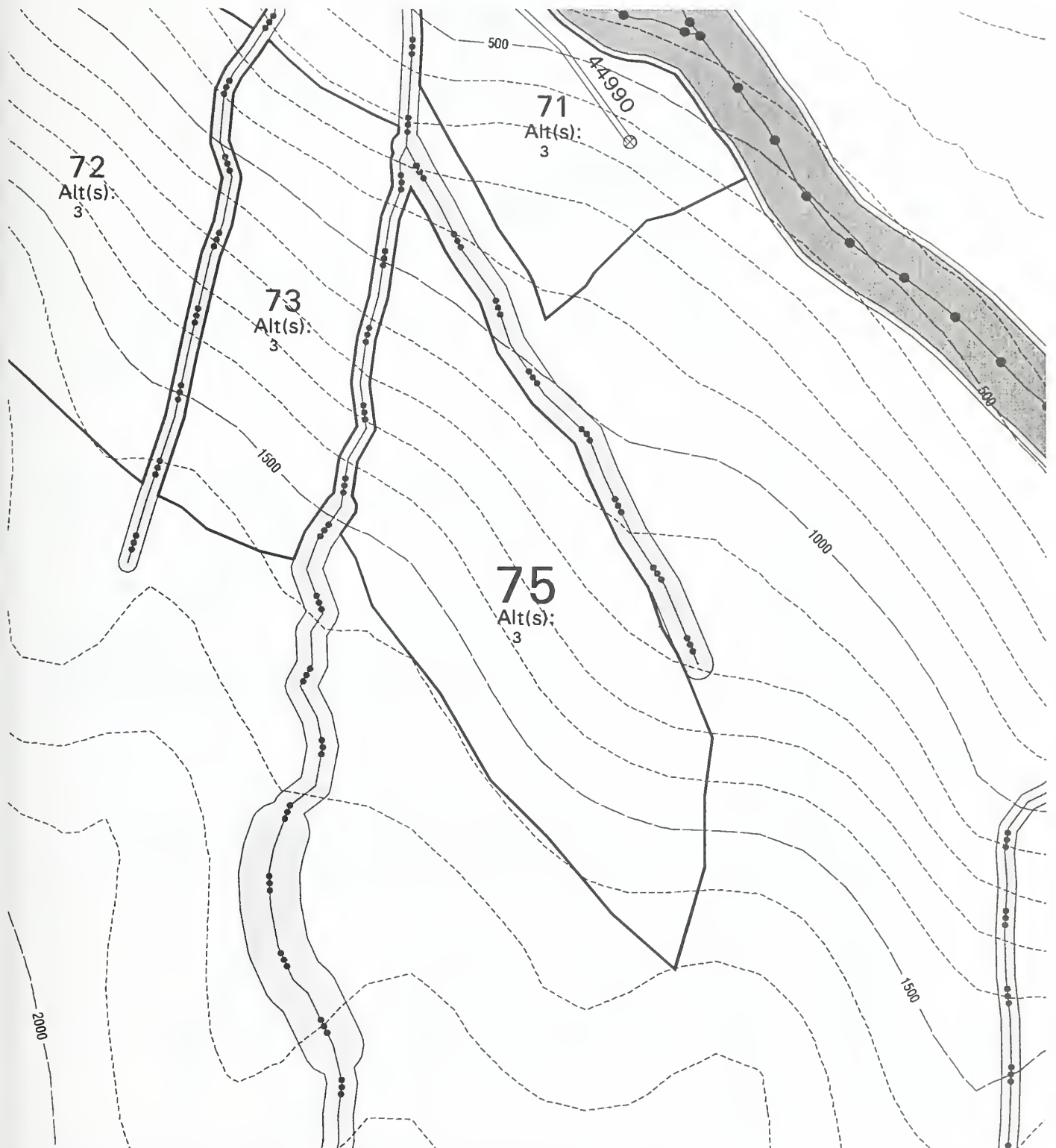
## **Silvicultural Prescription**

Group Selection - 30% removal

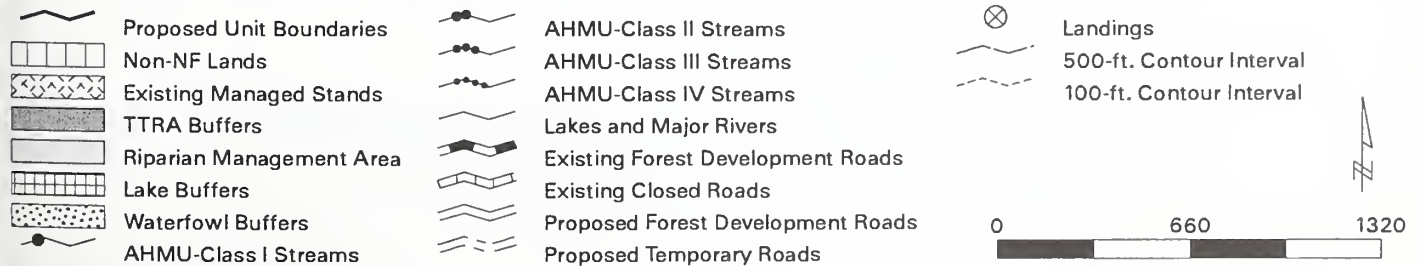
## **Logging System and Unit Design**

Maintain windfirm boundaries along Class III streams to the north and west. Unit is planned for helicopter logging utilizing landings in unit 65.

# Crystal Creek Timber Harvest Unit 75



Alternatives that include the proposed units are listed beneath the larger unit numbers.



## **Crystal Creek Unit Card**

### **Unit 76**

Acres: 60      Alternative (s): 2 and 6      MBF Volume: 306      MCF Volume: 86  
1977 Aerial Photo: Flight #: 53      Photo #: 101/102

## **Resource Concerns and Mitigation**

### **Wetlands**

Concern: Wetlands within the unit.

Mitigation: Wetter sites within the unit will be avoided where practicable and skid trails will be identified. Where possible, trees will be felled away from these sites to avoid filling with logging slash.

### **Wildlife**

Concern: Great blue heron nest north of unit.

Mitigation: Provide 600' buffer around nest. Prohibit road construction, tree falling and yarding in unit during the period of March 1 to August 15. If the nest is inactive for two consecutive years, the timing restriction will be lifted.

Concern: Wildlife movement across the unit from east to west (or vice versa), especially by goats and deer during periods of deep snowfall.

Mitigation: Maintain a 300'-wide forested corridor across the unit from west to east. Uphill of Road 44920, maintain this corridor along the north side of the unit next to the stream boundary. Downhill of Road 44920, design the group selection openings to maintain the corridor to Crystal Creek at the east boundary of the unit.

### **Fisheries**

Concern: Moderate Gradient/ Mixed Control, Class I stream channel east of the unit.

Mitigation: No commercial timber harvest within 100 feet of Class I stream channel. No programmed commercial timber harvest in the Riparian Management Area (greatest of flood plain, riparian vegetation or soil, riparian associated wetland fens, or 120 feet).

### **Hydrology**

Concern: High Gradient Contained, Class III stream channels to the north and south

Mitigation: No programmed commercial timber harvest within the Riparian Management Area, defined as the V-notch (side-slope break).

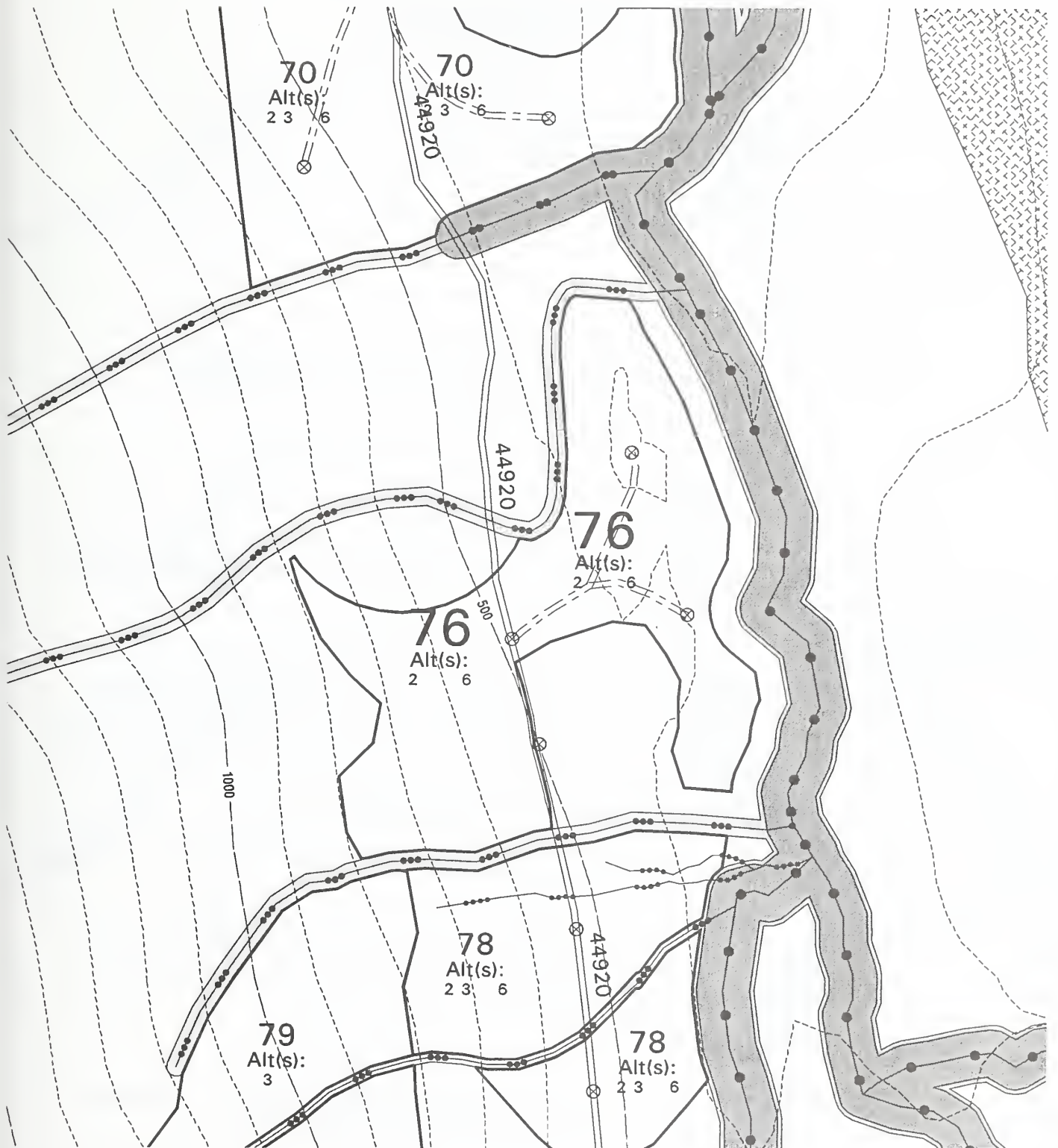
## **Silvicultural Prescription**

Clearcut with reserves up slope of Forest Road 44920 and group selection 30% removal below Forest Road 44920.

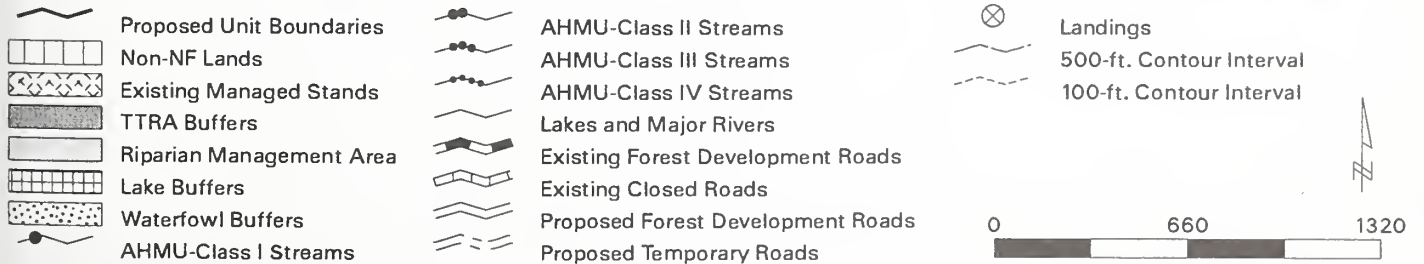
## **Logging System and Unit Design**

Unit is designed to follow Class I and III stream buffers on north and east sides following muskeg and low volume timber in southeast corner. Combination of cable logging above specified road is planned. Shovel logging from temporary roads on east side of unit will minimize soil disturbance.

# Crystal Creek Timber Harvest Unit 76



Alternatives that include the proposed units are listed beneath the larger unit numbers.





## **Crystal Creek Unit Card**

### **Unit 78**

Acres: 36      Alternative (s): 2, 3, and 6      MBF Volume: 684      MCF Volume : 191  
1977 Aerial Photo: Flight #: 53      Photo #: 102

## **Resource Concerns and Mitigation**

### **Wetlands**

Concern: Wetlands within the unit.

Mitigation: Wetter sites within the unit will be avoided where practicable and skid trails will be identified. Where possible, trees will be felled away from these sites to avoid filling with logging slash.

### **Fisheries**

Concern: Moderate Gradient/Mixed Control, Class I channel east of the unit.

Mitigation: No commercial timber harvest within 100 feet of Class I channel. No programmed commercial timber harvest in the Riparian Management Area (greatest of flood plain, riparian vegetation or soil, riparian associated wetland fens, or 120 feet).

### **Hydrology**

Concern: High Gradient Contained, Class III stream channels to the north and in the middle of the unit.

Mitigation: No programmed commercial timber harvest within the Riparian Management Area, defined as the V-notch (side-slope break).

Concern: Blowdown patterns indicate moderate risk for blowdown.

Mitigation: Feather both sides of the Class III stream buffer located in the center and along north unit boundary. Feathering should be conducted on both sides of this stream.

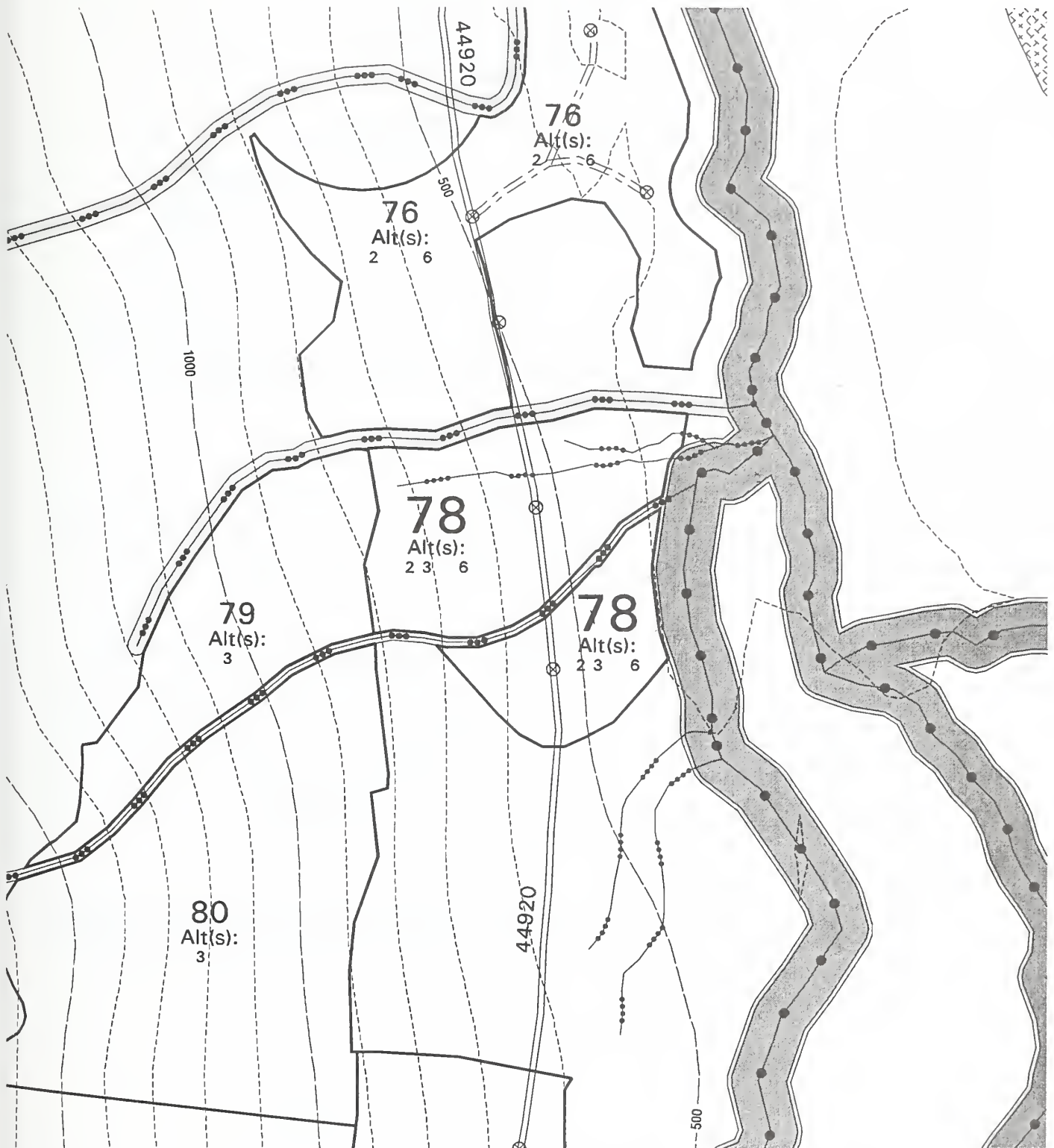
## **Silvicultural Prescription**

Clearcut with reserves. Look for opportunities to retain more than 15% of the basal area by leaving unmerchantable or large trees with low-economic value.

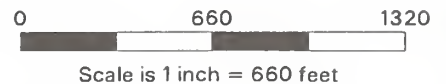
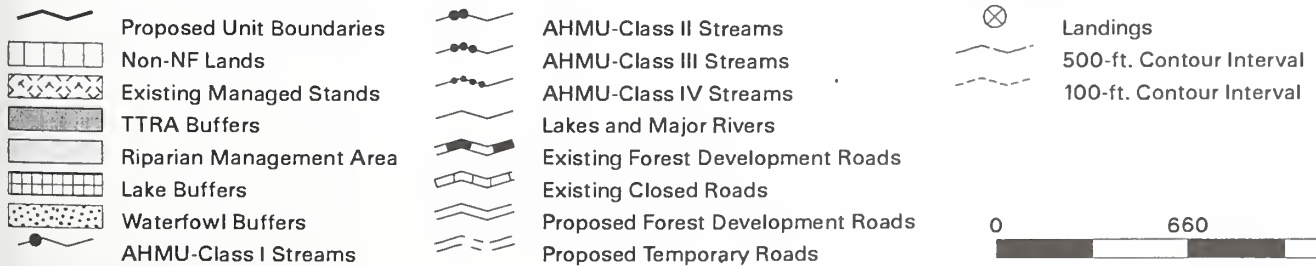
## **Logging System and Unit Design**

Unit is designed to follow Class I and III stream buffers on north and east boundary. Class III stream splits unit. Combination of shovel logging below road and cable logging above road is planned.

# Crystal Creek Timber Harvest Unit 78



Alternatives that include the proposed units are listed beneath the larger unit numbers.



**Crystal Creek Unit Card**  
**Unit 79**

Acres: 24      Alternative (s): 3    MBF Volume: 173      MCF Volume : 48  
1977 Aerial Photo: Flight #: 53      Photo #: 102

**Resource Concerns and Mitigation**

**Wetlands**

Concern: Wetlands within the unit.

Mitigation: Wetter sites within the unit will be avoided where practicable and skid trails will be identified. Where possible, trees will be felled away from these sites to avoid filling with logging slash.

**Wildlife**

Concern: Goat summer range in the alpine/subalpine habitat to the west of the unit.

Mitigation: Avoid helicopter overflights of the area above 1500 foot elevation to the west of the unit. Limit helicopter landings used by logging crews to designated landings adjacent to the units

**Hydrology**

Concern: High Gradient Contained, Class III stream channels to the north and in the middle of the unit.

Mitigation: No programmed commercial timber harvest within the Riparian Management Area, defined as the V-notch (side-slope break).

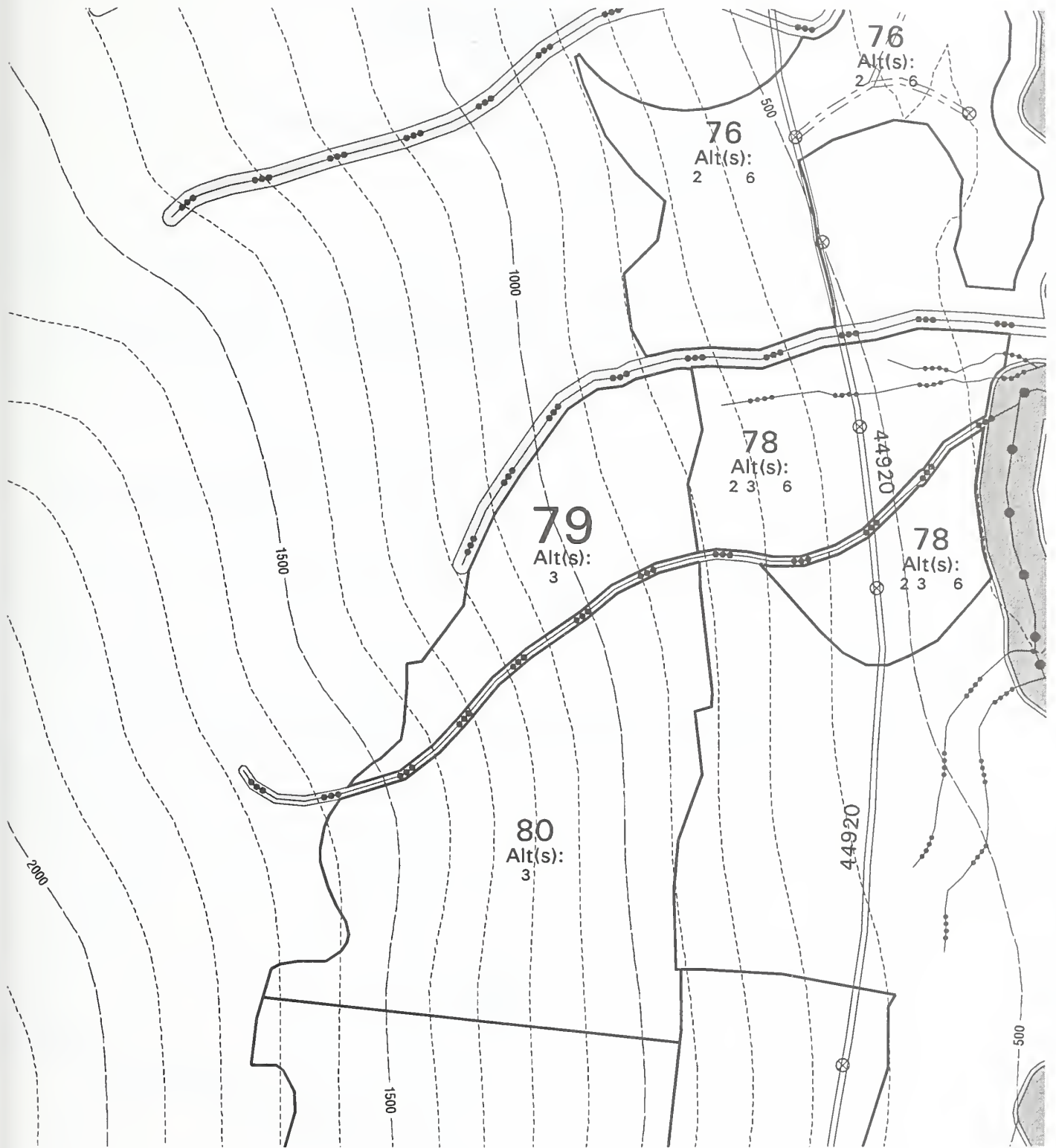
**Silvicultural Prescription**

Group Selection - 30% removal

**Logging System and Unit Design**

Unit boundary is designed to follow Class III stream buffers along north and south boundaries. Avoid forested wetland soils along southwest corner. Allow for adequate windfirm buffers. Unit is planned for helicopter logging utilizing landings in Unit 78.

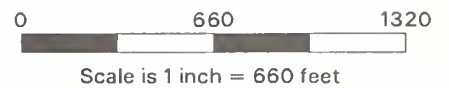
# Crystal Creek Timber Harvest Unit 79



Alternatives that include the proposed units are listed beneath the larger unit numbers.

- |  |                          |  |                                   |
|--|--------------------------|--|-----------------------------------|
|  | Proposed Unit Boundaries |  | AHMU-Class II Streams             |
|  | Non-NF Lands             |  | AHMU-Class III Streams            |
|  | Existing Managed Stands  |  | AHMU-Class IV Streams             |
|  | TTRA Buffers             |  | Lakes and Major Rivers            |
|  | Riparian Management Area |  | Existing Forest Development Roads |
|  | Lake Buffers             |  | Existing Closed Roads             |
|  | Waterfowl Buffers        |  | Proposed Forest Development Roads |
|  | AHMU-Class I Streams     |  | Proposed Temporary Roads          |

- Landings
- 500-ft. Contour Interval
- 100-ft. Contour Interval





**Crystal Creek Unit Card**  
**Unit 80**

Acres: 61      Alternative (s): 3      MBF Volume: 512    MCF Volume: 134  
1977 Aerial Photo: Flight #: 53      Photo #: 102

**Resource Concerns and Mitigation**

**Wildlife**

Concern: Goat summer range in the alpine/subalpine habitat to the west of the unit.

Mitigation: Avoid helicopter overflights of the alpine/subalpine area to the west of the unit. Limit helicopter landings used by logging crews to designated landings adjacent to the units

**Hydrology**

Concern: High Gradient Contained, Class III stream channel to the north of the unit.

Mitigation: No programmed commercial timber harvest within the Riparian Management Area, defined as the V-notch (side-slope break).

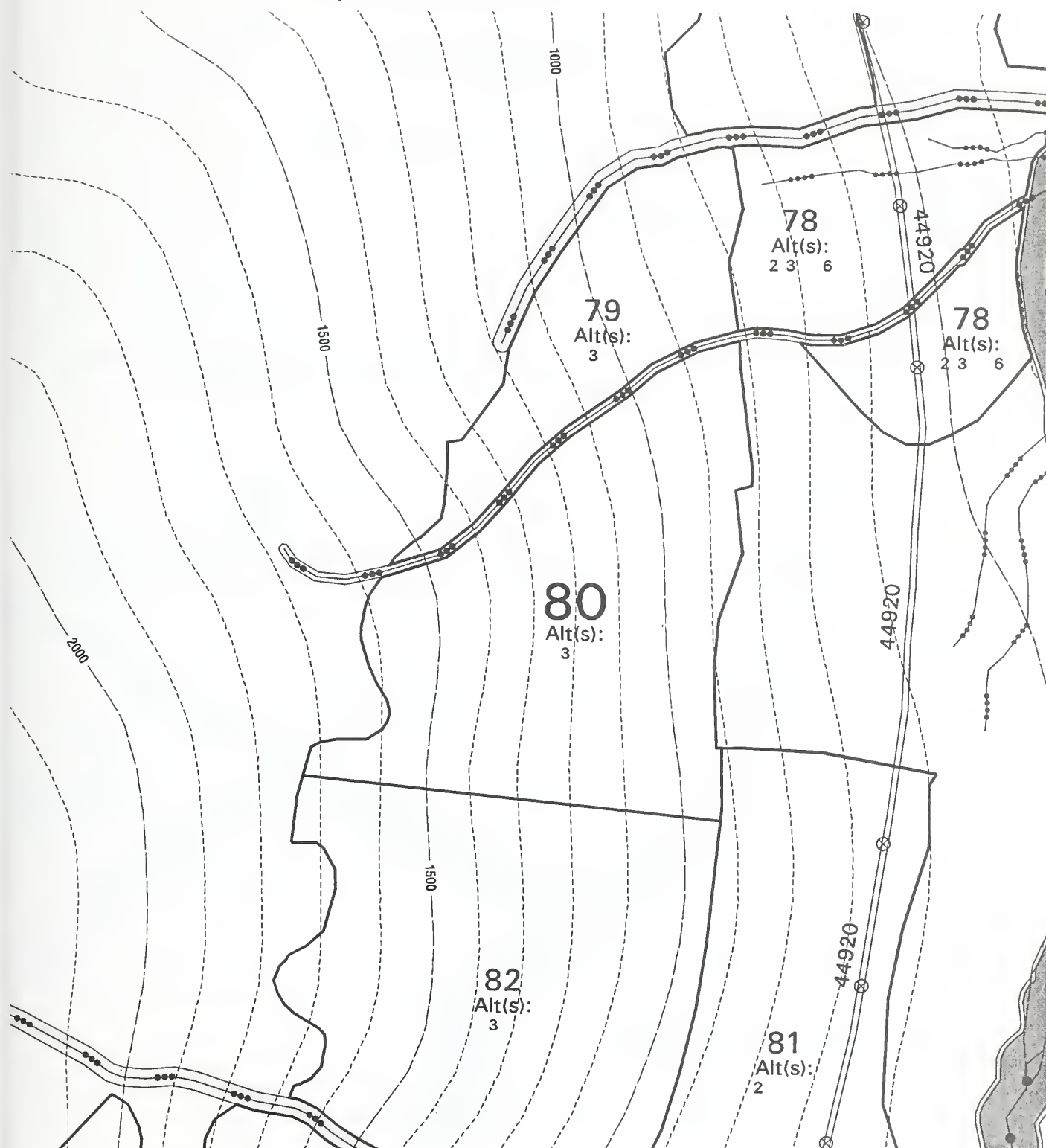
**Silvicultural Prescription**

Group Selection - 30% removal

**Logging System and Unit Design**

North boundary follows Class III stream V-notch. East boundary follows slope break. Unit is planned for helicopter logging utilizing landings along Forest Road 44920.

# Crystal Creek Timber Harvest Unit 80



Alternatives that include the proposed units are listed beneath the larger unit numbers.

- |  |                          |  |                                   |  |                          |
|--|--------------------------|--|-----------------------------------|--|--------------------------|
|  | Proposed Unit Boundaries |  | AHMU-Class II Streams             |  | Landings                 |
|  | Non-NF Lands             |  | AHMU-Class III Streams            |  | 500-ft. Contour Interval |
|  | Existing Managed Stands  |  | AHMU-Class IV Streams             |  | 100-ft. Contour Interval |
|  | TTRA Buffers             |  | Lakes and Major Rivers            |  |                          |
|  | Riparian Management Area |  | Existing Forest Development Roads |  |                          |
|  | Lake Buffers             |  | Existing Closed Roads             |  |                          |
|  | Waterfowl Buffers        |  | Proposed Forest Development Roads |  |                          |
|  | AHMU-Class I Streams     |  | Proposed Temporary Roads          |  |                          |

0 660 1320

Scale is 1 inch = 660 feet

**Crystal Creek Unit Card**  
**Unit 81**

Acres: 61      Alternative (s): 2 MBF Volume: 1193      MCF Volume : 327  
1977 Aerial Photo: Flight #: 53      Photo #: 103

**Resource Concerns and Mitigation**

**Wetlands**

Concern: Wetlands within the unit.

Mitigation: Wetter sites within the unit will be avoided where practicable and skid trails will be identified. Where possible, trees will be felled away from these sites to avoid filling with logging slash.

**Fisheries**

Concern: High Gradient Contained Class II stream channels to the south of the unit.

Mitigation: No commercial timber harvest within 100 feet of the channel. No programmed commercial timber harvest within the Riparian Management Area, defined as within 100 feet of the stream or to the top of the V-notch (side-slope break) whichever is greater.

**Hydrology**

Concern: Existing blowdown pattern indicates some blowdown could occur.

Mitigation: Feather Class II and III stream buffers to protect against blowdown.

**Wetlands**

Concern: Forest wetland, Maybeso series soils, along west border.

Mitigation: Unit is designed to avoid these soils.

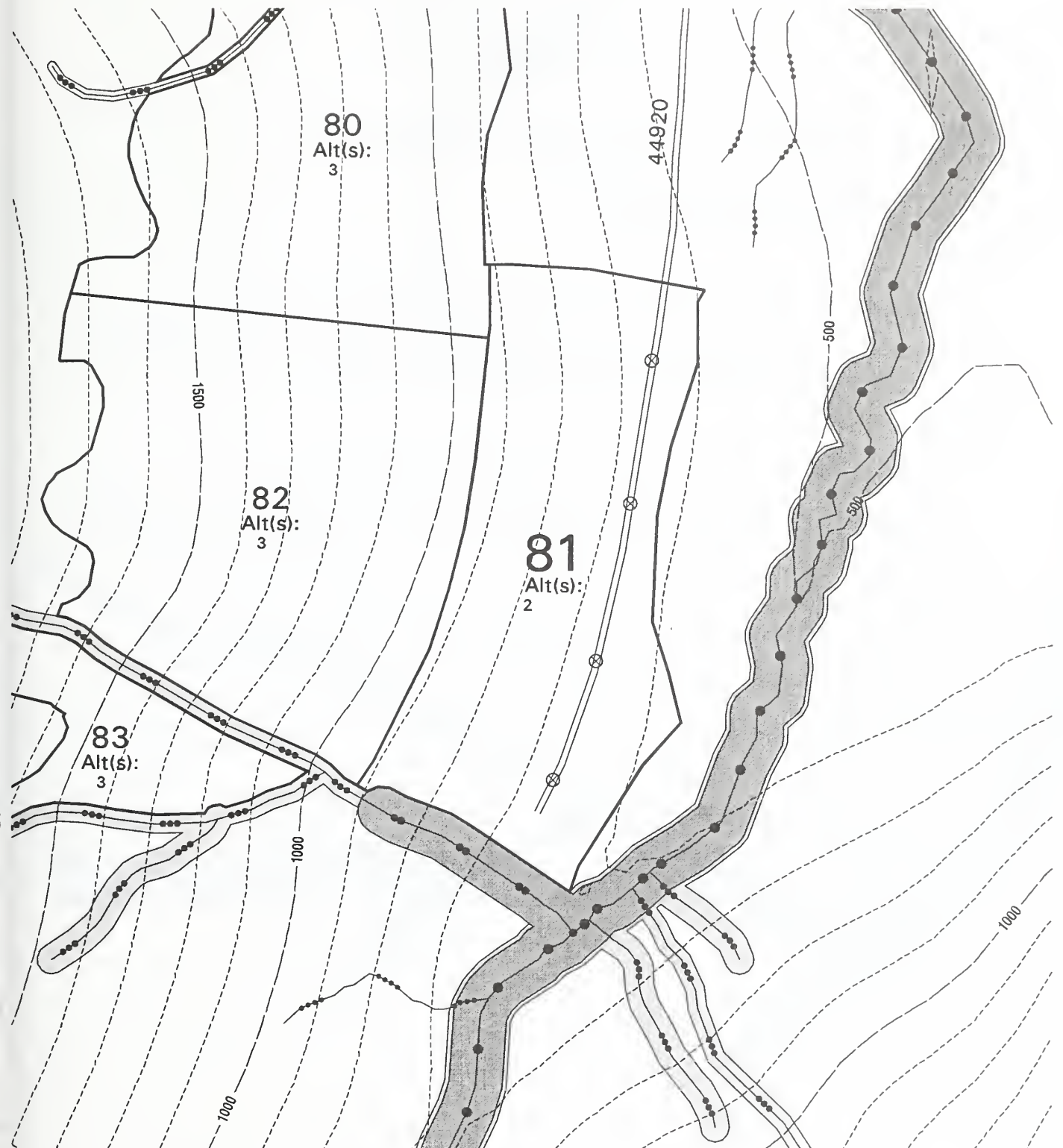
**Silvicultural Prescription**

Clearcut with reserves

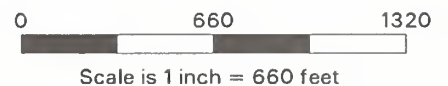
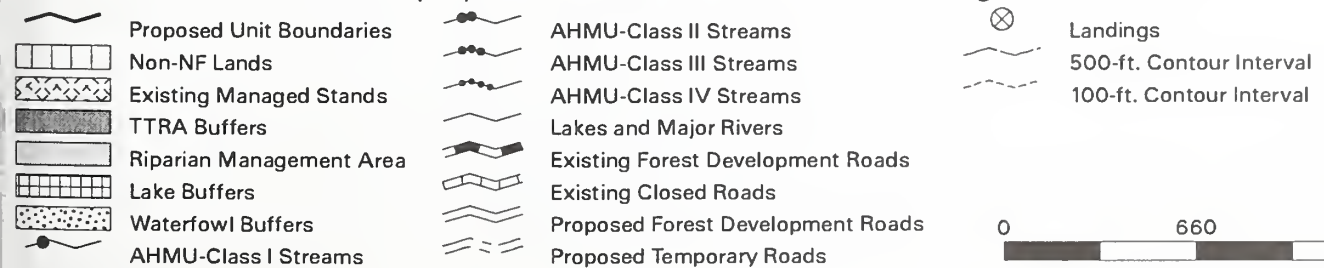
**Logging System and Unit Design**

West boundary is designed to follow slope break. East boundary follows muskeg chain and the south boundary is along the Class II stream buffer edge. Cable logging is planned from multiple landings.

# Crystal Creek Timber Harvest Unit 81



Alternatives that include the proposed units are listed beneath the larger unit numbers.





**Crystal Creek Unit Card**  
**Unit 82**

Acres: 74      Alternative (s): 3      MBF Volume: 635      MCF Volume: 162  
1977 Aerial Photo: Flight #: 53      Photo #: 103

**Resource Concerns and Mitigation**

**Wildlife**

Concern: Goat summer range in the alpine/subalpine habitat to the west of the unit.

Mitigation: Avoid helicopter overflights of the alpine/subalpine area to the west of the unit. Limit helicopter landings used by logging crews to designated landings adjacent to the units.

**Watershed**

Concern: High Gradient Contained, Class III channels to the south of the unit.

Mitigation: No programmed commercial timber harvest within the Riparian Management Area, defined as the V-notch (side-slope break).

**Wetlands**

Concern: Forest wetland, Maybeso series soils, along west border.

Mitigation: Unit boundary avoids these soils.

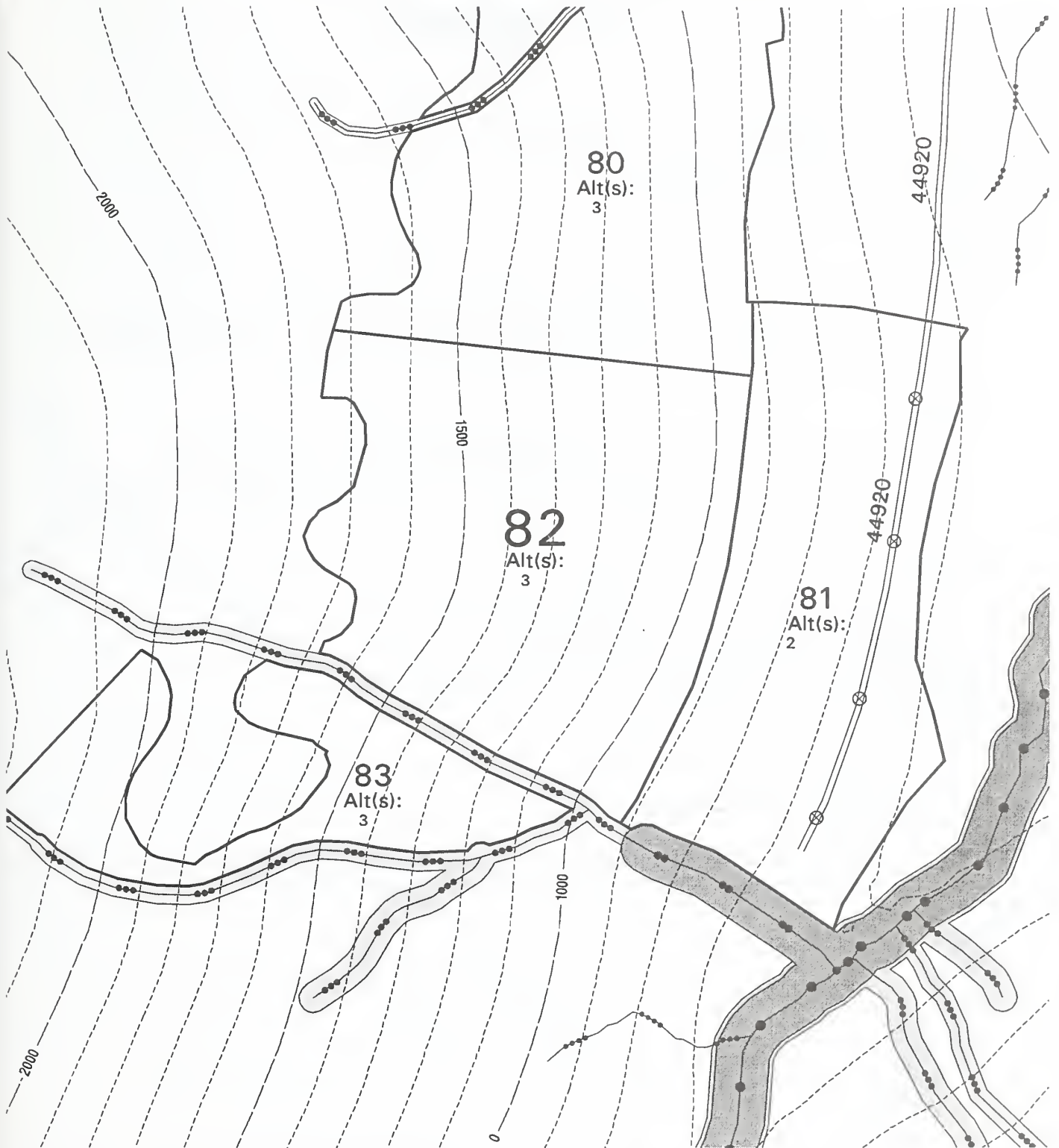
**Silvicultural Prescription**

Group Selection - 30% removal

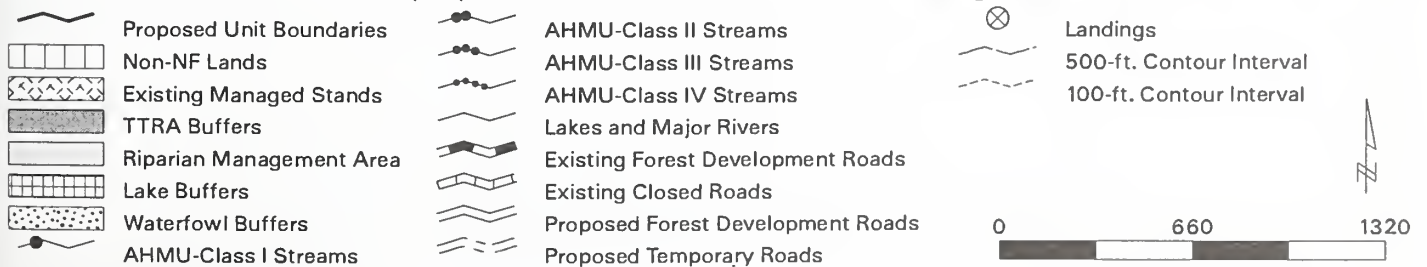
**Logging System and Unit Design**

North and east boundary common with Units 80 and 81. South boundary follows Class III stream buffer and northwest boundary follows forested wetland soil type. Unit is planned for helicopter yarding utilizing landings along Forest Road 44920.

# Crystal Creek Timber Harvest Unit 82



Alternatives that include the proposed units are listed beneath the larger unit numbers.



**Crystal Creek Unit Card**  
**Unit 83**

Acres: 26      Alternative (s): 3  
1977 Aerial Photo: Flight #: 53

MBF Volume: 211  
Photo #: 103

MCF Volume : 55

## **Resource Concerns and Mitigation**

### **Wildlife**

Concern: Goat summer range in the alpine/subalpine habitat to the west of the unit.

Mitigation: Avoid helicopter overflights of the alpine/subalpine area to the west of the unit. Limit helicopter landings used by logging crews to designated landings adjacent to the units.

### **Hydrology**

Concern: High Gradient Contained, Class III stream channels to the north and south of the unit.

Mitigation: No programmed commercial timber harvest within the Riparian Management Area, defined as the V-notch (side-slope break).

### **Wetland**

Concern: Unit surrounds a forested wetland of Maybeso soils.

Mitigation: Unit boundary will avoid these soils.

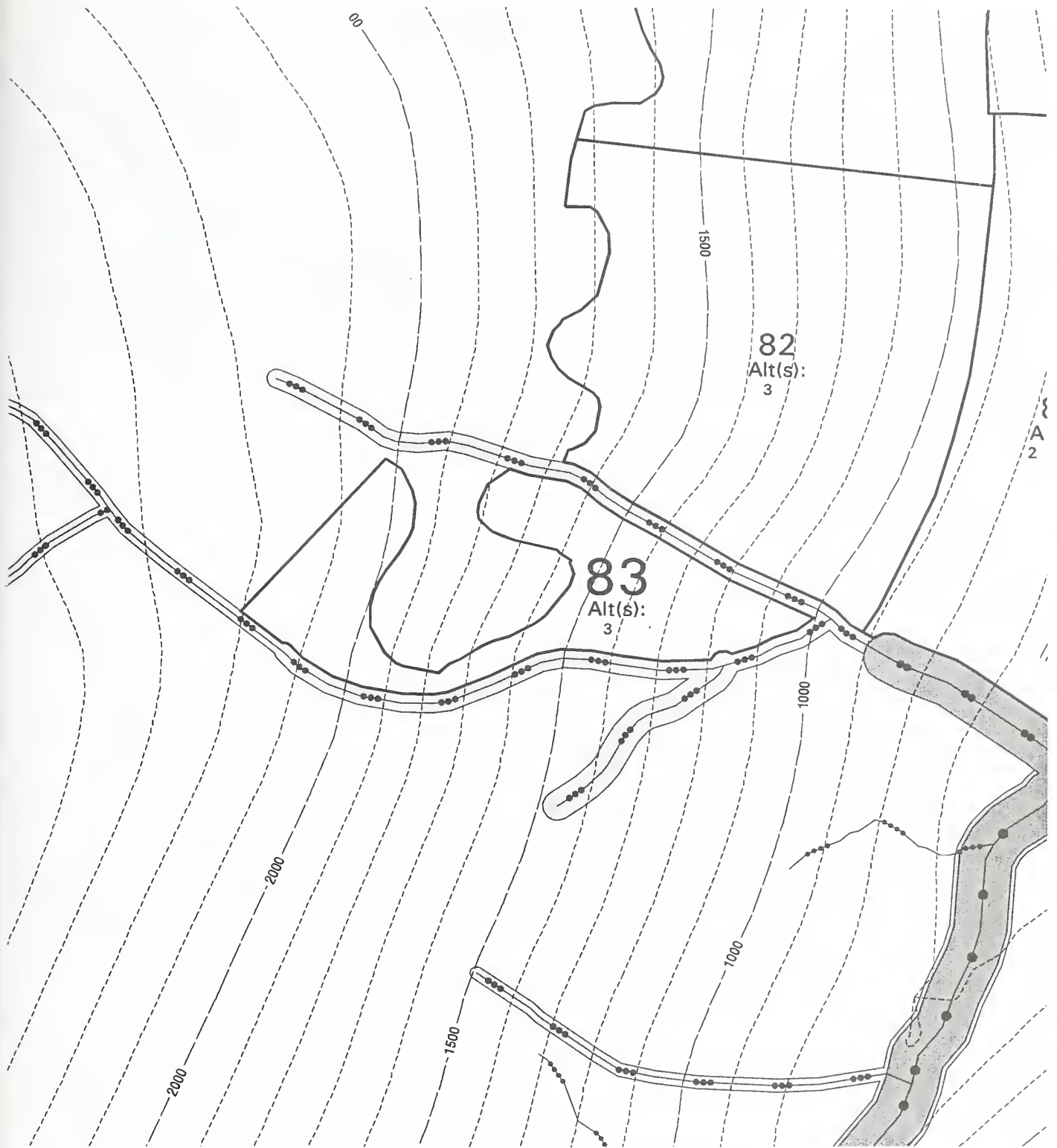
## **Silvicultural Prescription**

Group Selection - 30% removal

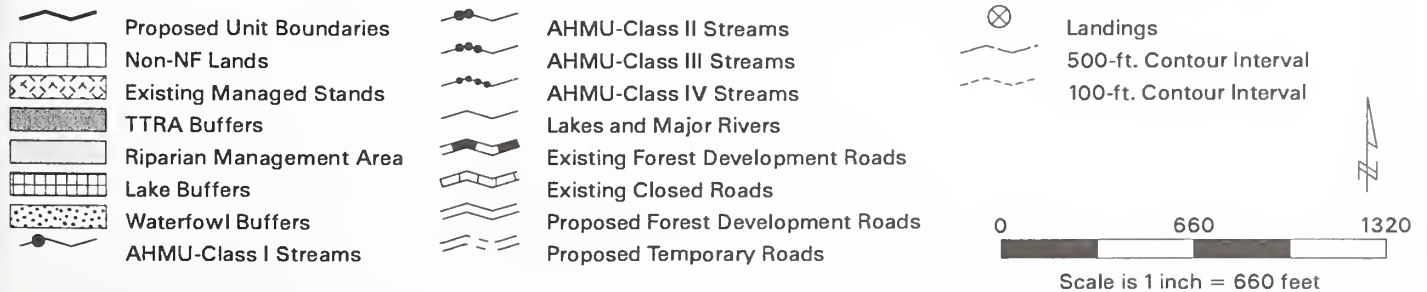
## **Logging System and Unit Design**

Unit boundary follows Class III stream buffer V-notches on the north and east sides. West boundary follows forested wetland soil type. Helicopter logging planned utilizing landings in Unit 81.

# Crystal Creek Timber Harvest Unit 83



Alternatives that include the proposed units are listed beneath the larger unit numbers.





**Crystal Creek Unit Card**  
**Unit 85**

Acres: 14    Alternative (s): 2, 5 and 6    MBF Volume: 113, 151, 343    MCF Volume : 29, 38, 84  
1977 Aerial Photo: Flight #: 53                      Photo #: 96

**Resource Concerns and Mitigation**

**Hydrology**

Concern: High Gradient Contained, Class III stream channels to the north, south and middle of the unit.

Mitigation: No programmed commercial timber harvest within the Riparian Management Area, defined as the V-notch (side-slope break).

**Landslide Prone Soils**

Concern: Two small inclusions along northern border with isolated areas of steep slope.

Mitigation: Retain some trees on the steeper slopes to maintain slope stability.

**Scenery**

Concern: Portion of unit visible from Thomas Bay.

Mitigation: Unit as designed addressed scenic concern.

**Silvicultural Prescription**

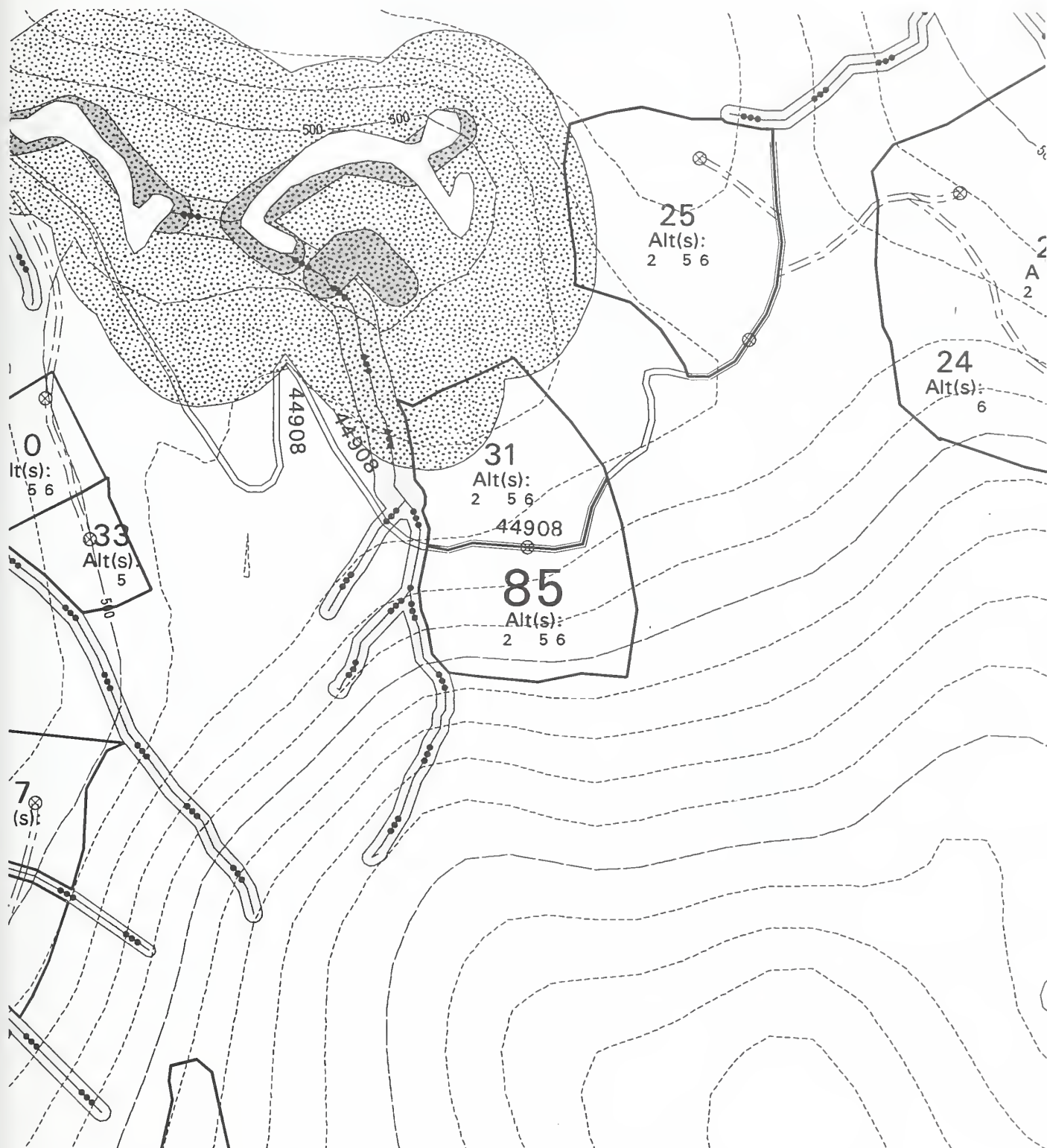
Group Selection - 40% removal    (Alternative 5)

Clearcut with Reserves    (Alternative 2, 6)

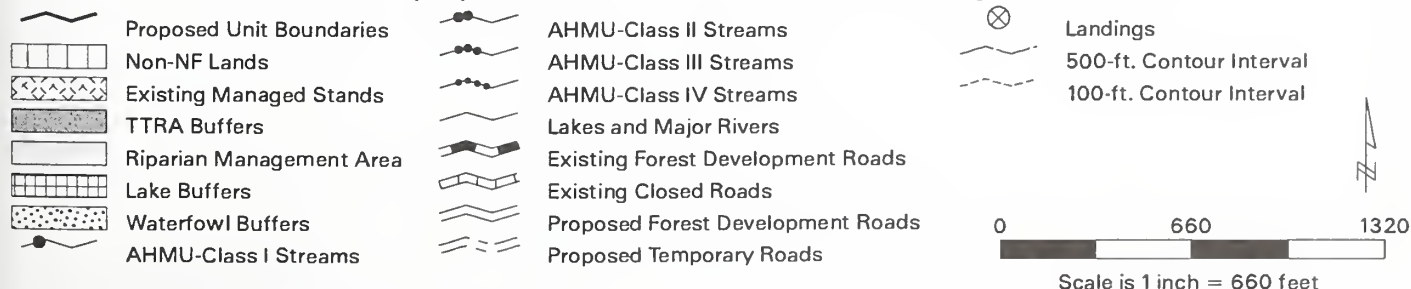
**Logging System and Unit Design**

Unit is designed for cable yarding from specified road. Class III stream borders west boundary and south boundary follows slope break.

# Crystal Creek Timber Harvest Unit 85



Alternatives that include the proposed units are listed beneath the larger unit numbers.



## **Crystal Creek Unit Card**

### **Unit 86**

Acres: 14      Alternative (s): 2, 3, and 6      MBF Volume: 226      MCF Volume : 65  
1977 Aerial Photo: Flight #: 53      Photo #: 99

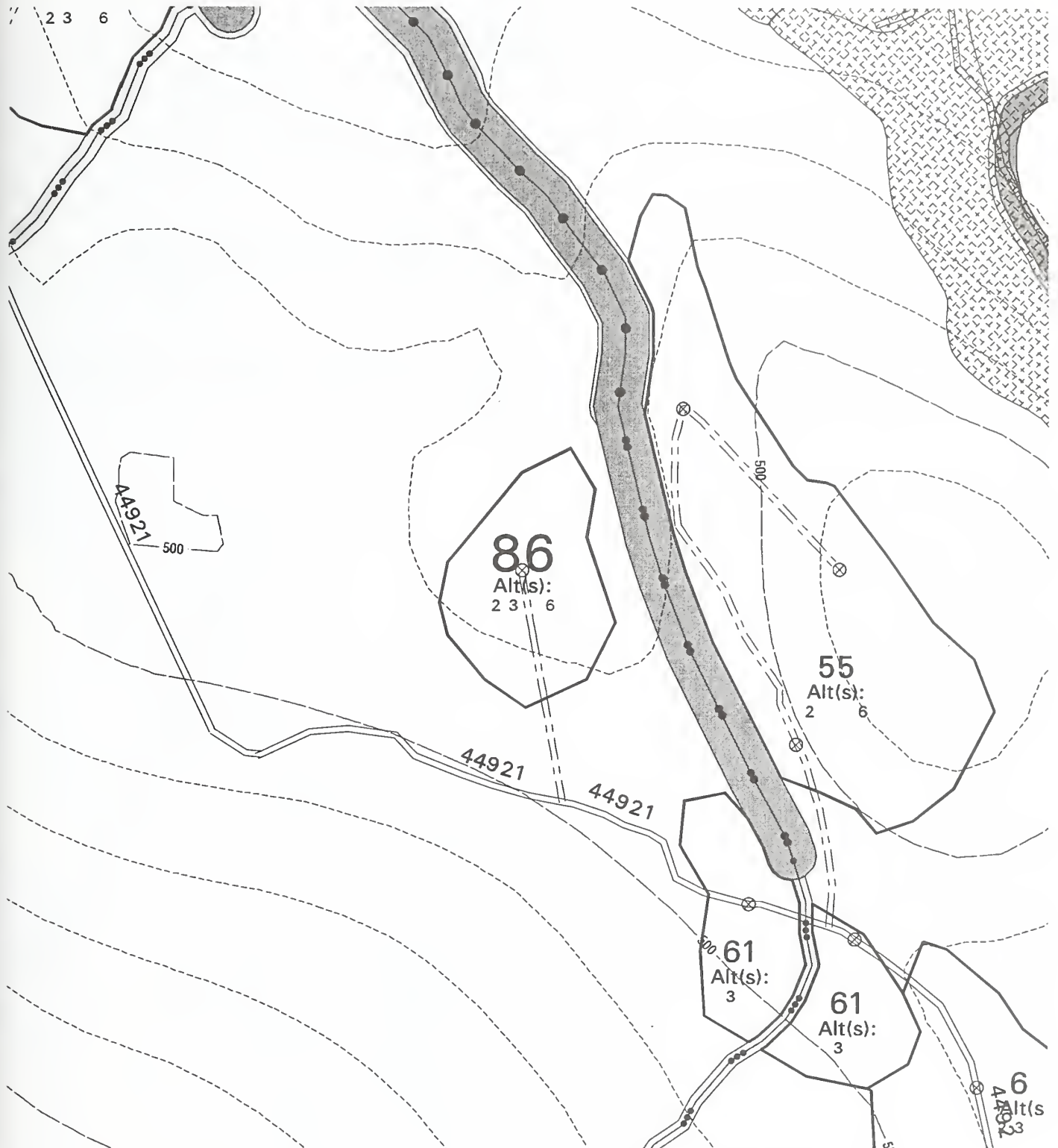
### **Silvicultural Prescription**

Clearcut with reserves. Look for opportunities to retain more than 15% of the basal area by leaving unmerchantable or large trees with low-economic value.

### **Logging System and Unit Design**

Unit is accessed by temporary road and is planned for shovel logging. Unit design follows low volume timber.

# Crystal Creek Timber Harvest Unit 86



Alternatives that include the proposed units are listed beneath the larger unit numbers.

- |  |                          |  |                                   |
|--|--------------------------|--|-----------------------------------|
|  | Proposed Unit Boundaries |  | AHMU-Class II Streams             |
|  | Non-NF Lands             |  | AHMU-Class III Streams            |
|  | Existing Managed Stands  |  | AHMU-Class IV Streams             |
|  | TTRA Buffers             |  | Lakes and Major Rivers            |
|  | Riparian Management Area |  | Existing Forest Development Roads |
|  | Lake Buffers             |  | Existing Closed Roads             |
|  | Waterfowl Buffers        |  | Proposed Forest Development Roads |
|  | AHMU-Class I Streams     |  | Proposed Temporary Roads          |

- |  |                          |
|--|--------------------------|
|  | Landings                 |
|  | 500-ft. Contour Interval |
|  | 100-ft. Contour Interval |

0 660 1320

Scale is 1 inch = 660 feet



**Crystal Creek Unit Card**  
**Unit 87**

Acres: 46      Alternative (s): 5  
1977 Aerial Photo: Flight #: 49

MBF Volume: 1109  
Photo #: 154

MCF Volume: 283

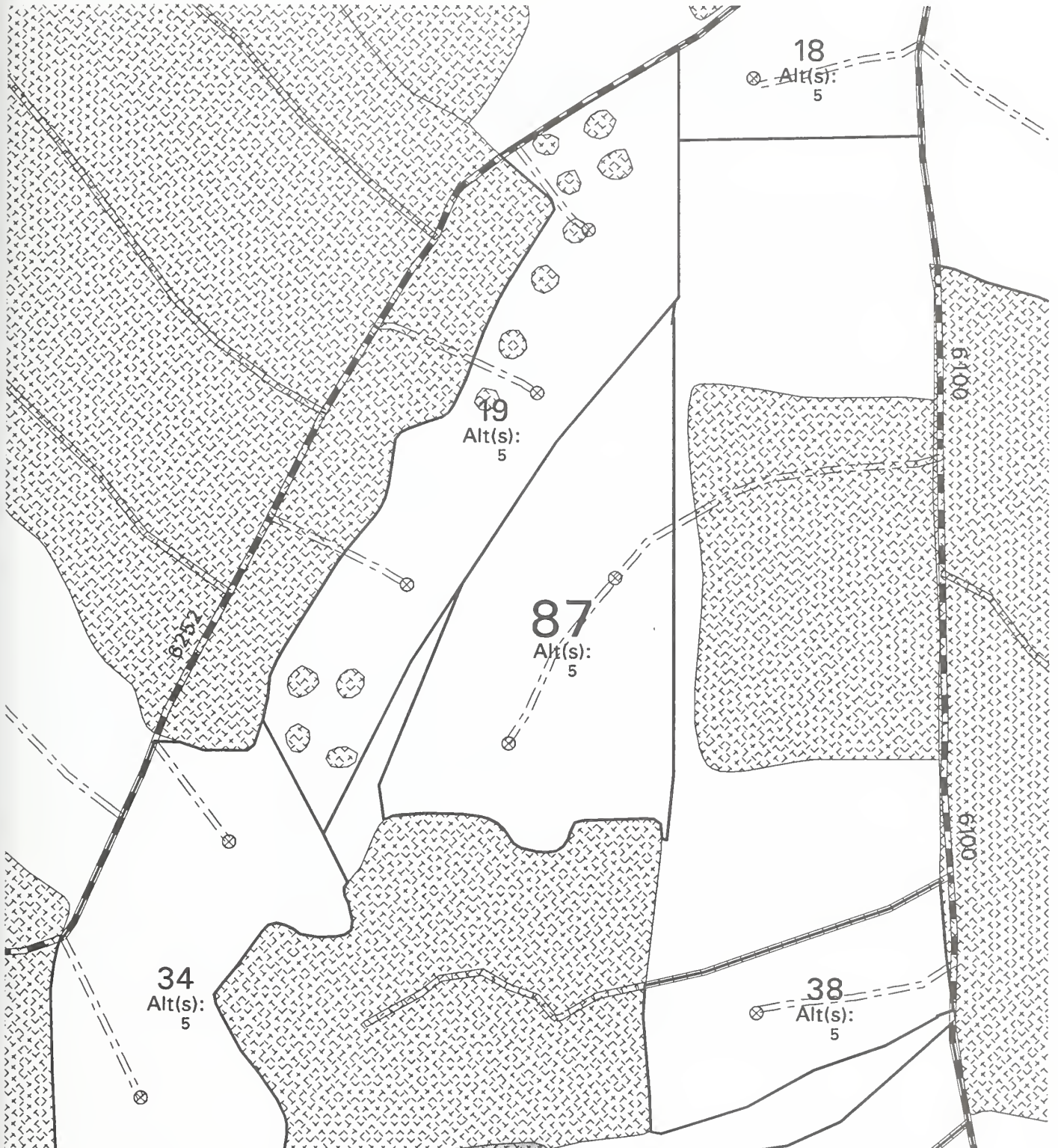
**Silvicultural Prescription**

Clearcut with reserves. Look for opportunities to retain more than 15% of the basal area by leaving unmerchantable or large trees with low-economic value.

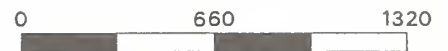
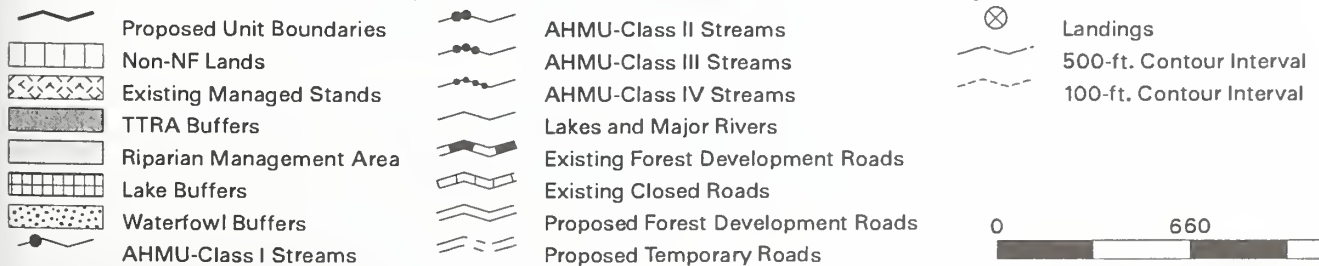
**Logging System and Unit Design**

Unit is designed to have common boundaries with managed stands and Unit 19. Temporary road is planned to minimize shovel yarding distance reducing soil disturbance.

# Crystal Creek Timber Harvest Unit 87



Alternatives that include the proposed units are listed beneath the larger unit numbers.



Scale is 1 inch = 660 feet



# Thinning and Pruning

## Thinning and Pruning

The management objectives need to be clearly defined prior to preparation of any prescription. A silvicultural prescription written to meet the objectives of one resource may not only be incompatible with the objectives of another resource but may oppose its objectives. However, as at the Crystal Creek Project Area, prescriptions may complement several objectives. The objectives in these second growth stands are to improve on stand condition for future timber harvests and improve/maintain moose habitat.

Several factors affect the thinning and pruning prescriptions including: the stocking density (trees per acre), site productivity (site index), marketability of the trees, tree diameter, species mix, stand age, management objectives, and future treatments.

Stocking density, with the average tree diameter (together used to determine the basal area), mostly influences the radial growth (growth in tree diameter). Thinning is the key to increasing radial growth. Wider spacing will be necessary if there is little or no likelihood of future treatments. However, with a wider spacing, in addition to release of more of the herbaceous element in the stand, there is a danger of invasion (germination and release) of hemlock in the understory. The hemlock could outcompete the herbaceous component. Consequently, caution should be used in the spacing, not thinning too widely.

Many of the stands in the Crystal Creek Project Area have been thinned previously, most of those at 8' x 8' spacing between the trees. With that spacing, after about 10 to 15 years following the thinning, the herbaceous layer is usually in a poor state being outcompeted by the trees. The time factor is dependent, principally, on the site productivity. Consequently, many of these stands require a rethin in order to maintain the herbaceous component. Several of these stands have been rethinned. Some of the stands are beyond rethinning because there is very little or no residual understory to release.

Thinning spacing between trees will vary between 14 and 20 feet. Spacing in stands which are being thinned for the first time will probably be 14 and 16 feet. Units to be rethinned will probably be spaced at 18 and 20 feet because the trees are larger and have been thinned once already (their basal area is already reduced). Each stand will be evaluated on its own merit. A few of the stands may deviate from the range of 14 to 20 feet, depending on the final analysis.

Higher priority may be given to trees with the higher site productivity since the more highly productive the stand, the greater the return on the capital investment in the thinning. Site index is a measure of the site productivity, i.e. the height growth rate of the trees over a fixed period of time.

Tree size and species may be important factors to be considered when determining the marketability of timber. If the stand is marketable prior to reaching maturity (rotation age), there may be revenue generated from a thin (commercial thin) which makes the thinning prospects more equitable. Otherwise, appropriated money must be requested from Congress for precommercial thinning.

Tree size, again, may be a factor when considering the treatments. The stand may need some treatment in order to maintain the herbaceous layer. Trees may be large enough to be marketable (>9" dbh) but there are no interested purchasers. One of the problems that



may preclude thinning is the slash from thinning. Slash from large trees removed in a thin may inhibit wildlife movement, particularly deer and moose and also prevent understory vegetation growth. In these cases, it may be too late to thin for wildlife forage. In addition, in order to minimize the rate of stand maturity and maximize economic viability, the stands need to maintain the larger trees and remove the smaller trees.

In some cases where the trees are too large to thin, pruning may be a viable option. Pruning allows enough side-light from the sun to enter the forest floor to release the herbaceous layer, consequently extending the longevity of the herbaceous layer. The extent of the longevity is unknown; pruning will not keep the forage open as long as thinning. There is little or no slash to inhibit wildlife travel.

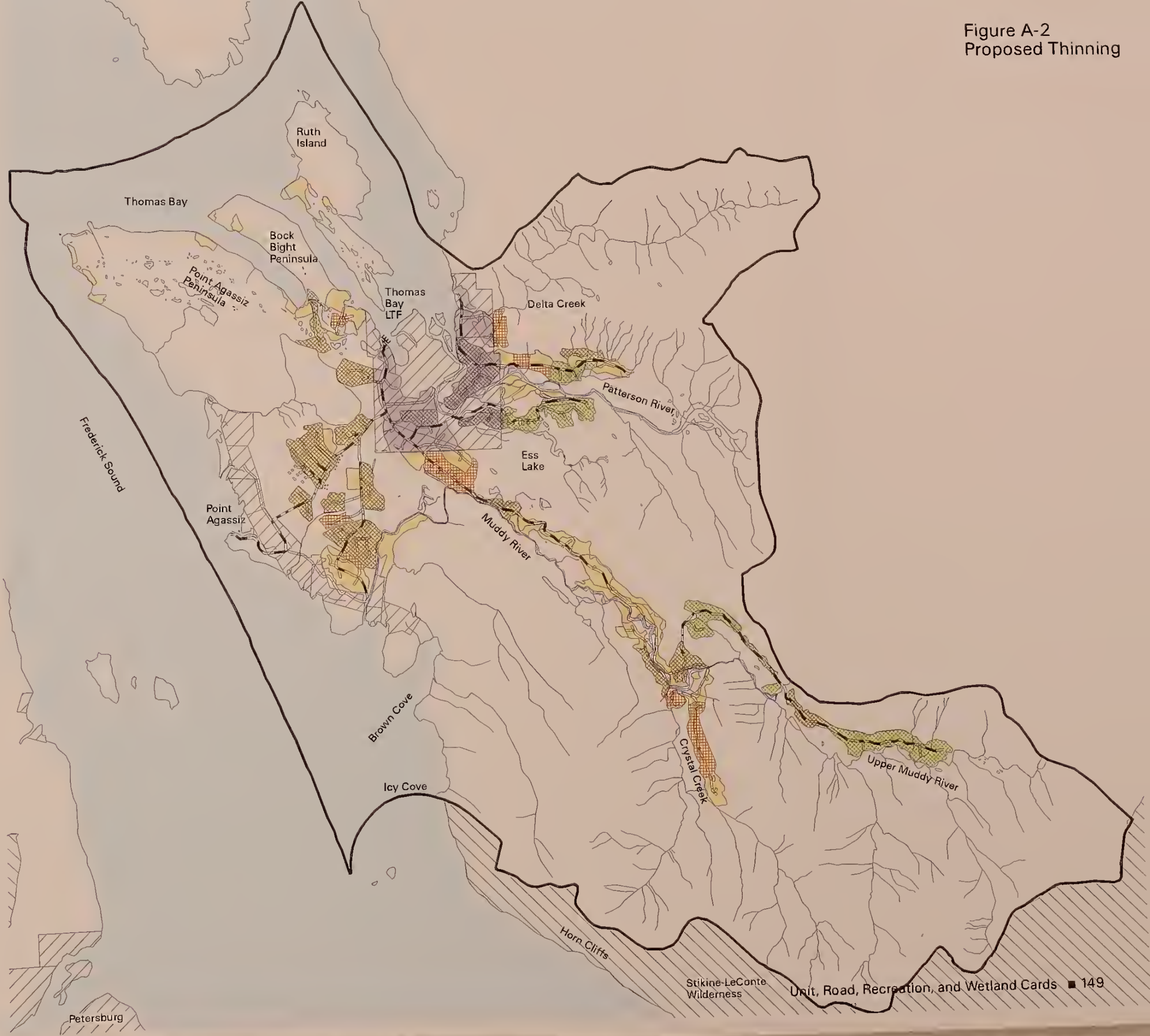
Stand age determines whether that stand is eligible for an intermediate treatment (thinning) or a regeneration harvest (clearcut, single-tree selection, group selection, etc.). Intermediate treatments are, as the name implies, treatments prior to final harvest, usually done to improve stand condition, e.g. thinning and pruning, predicated on further stand development and growth. In contrast, the objective of a regeneration harvest is to remove the timber because growth rate has declined and optimal growth has ceased; the stand needs to be harvested to initiate a new stand.

When considering a precommercial thinning, it is important to consider whether that stand may be a viable candidate for a future commercial thin or another precommercial thin. Spacing for the first thin will be contingent upon subsequent thinning or other treatments.

Figure A-2  
Proposed Thinning

Legend

- PRECOMMERCIAL THINNING:
- Accomplished 1982-1998
  - Proposed 1999-2010 (one thinning)
  - Two Thinnings:  
First Thinning 1982-1998  
Second Thinning 1999-2010
- Saltwater
- Existing NF Managed Stands
  - Existing State Managed Stands
- Wilderness
- Non-National Forest Lands
- Log Transfer Facility (LTF)
- Crystal Creek Project Area Boundary
- Existing Permanent Roads
- Existing Closed Roads
- Class I/II/III Streams



map:gis/projects/crystal/plots/feisplots/mgdthin.map 10/20/98  
macros: feismap.aml, mgdthin.aml



# Road Cards

The following summary includes existing and proposed road descriptions (see Figure B-1 for road location). The proposed road descriptions are based on information gathered during field reconnaissance and would be used for the final location, survey and construction of roads in the selected alternative. Soil and water resource protection measures were considered when locating the roads. The avoidance of unstable, sensitive, and fragile areas were primary considerations incorporated into the location of these roads. In addition to the following road descriptions, more detailed information is found in the planning file. The road descriptions include the Travelway Management Prescriptions.

## Open Roads

The primary existing roads within the project area that will remain open for public motorized travel are:

- ◆ Forest Road 6256 which runs from the Thomas Bay log transfer/gravel barge facility south and east along the Muddy River,
- ◆ Forest Road 6101 which runs east and west south of the Patterson River,
- ◆ Forest Road 6252 which connects Point Agassiz to Forest Road 6256, and
- ◆ Forest Road 6100 which goes to the mouth of the Muddy River from Road 6256.

A portion of Forest Road 6256 will be relocated where the Muddy River has washed out the original alignment.

## Road Closures:

All new roads constructed will be closed following timber harvest activities. To accomplish this, drainage structures will be removed or bypassed, waterbars will be constructed, and any needed erosion control measures will be taken. Some incidental all terrain vehicle use is expected on at least some of these roads following closure. A motorized closure during timber harvest will be enforced on Forest Roads 44920 and 44921 located in the Crystal Creek/Brown Cove Lake (Long Lake) watersheds. This restriction is to protect the mountain goat population in the Horn Cliffs area. Approximately 6.6 miles of temporary roads will also be closed.














## GLOSSARY for RMO FORM VALUES:

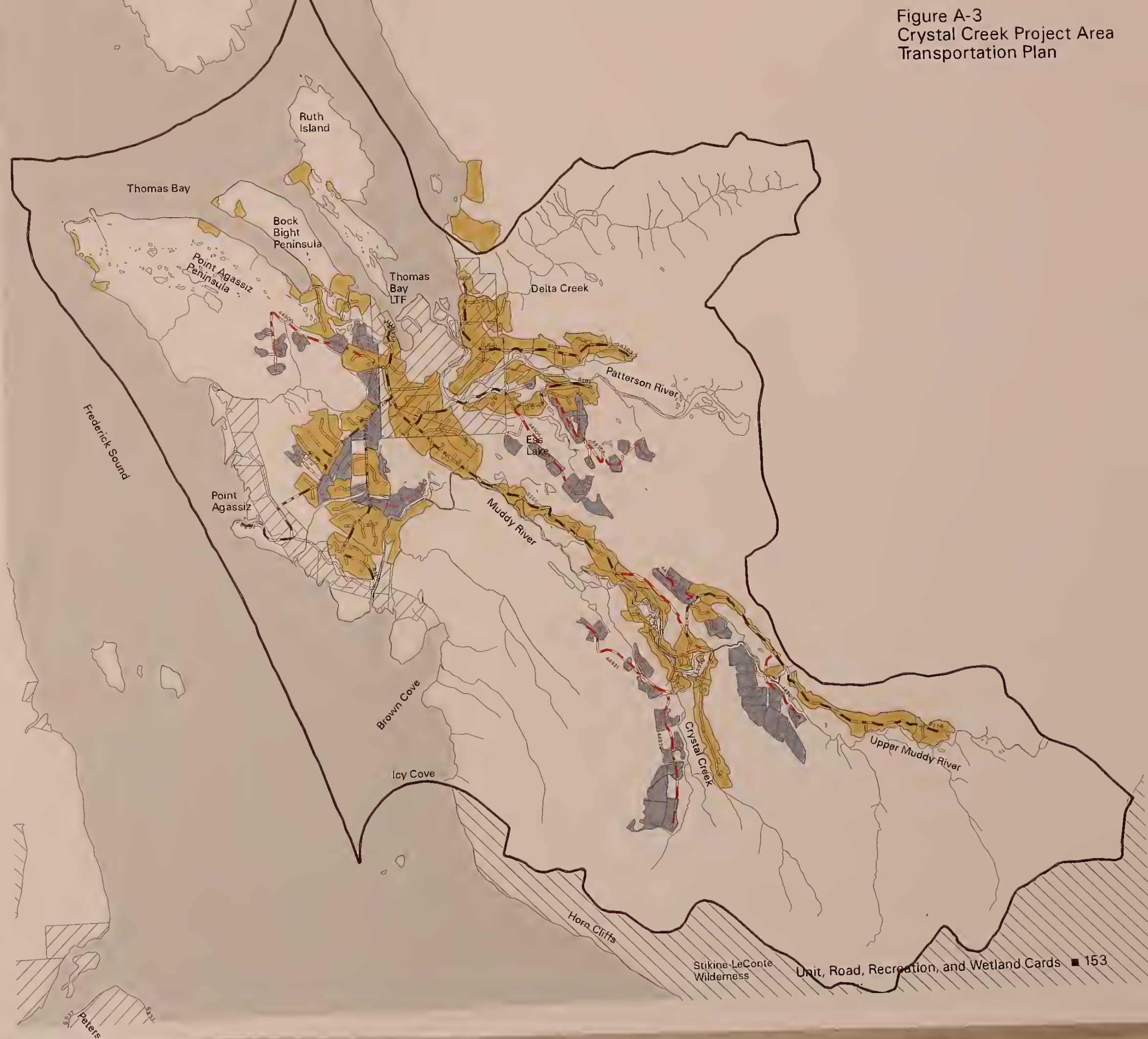
|                                   |   |
|-----------------------------------|---|
| <b>Road Number</b>                | Normally only long-term Forest Development Roads are assigned road numbers.   |
| <b>Road Name</b>                  | All long-term roads assigned numbers will be given names.   |
| <b>NEPA</b>                       | Enter the name of the NEPA document that addresses the environmental impacts of this road.  |
| <b>Termini</b>                    | The beginning and ending location of the road.  |
| <b>Entry Cycle</b>                | Constant (C) or Intermittent (I).   |
| <b>Length (miles)</b>             | Best estimate of the length of road.  |
| <b>VCU</b>                        | Value Comparison Unit number that road is located in.   |
| <b>Functional Service</b>         | Arterial (A) = primary; Collector (C) = secondary; or Local (L) = tertiary.   |
| <b>Travel Class</b>               | Lists classes of traffic which will be encouraged, accepted, discouraged, prohibited, or eliminated.  |
| <b>Design Speed (mph)</b>         | 10, 20, or 30.  |
| <b>Width (ft)</b>                 | Travelway width of road, 14 foot, 16 foot normal values.  |
| <b>Service Life</b>               | Short-term (less than 10 years) or Long-term. Long-term used in conjunction with Entry Cycle to be Long-term Constant (LC) or Long-term Intermittent (LI).  |
| <b>Design Vehicle</b>             | The vehicle frequently using the road that determines the minimum standard for a particular design element passenger car, pick-up, logging truck, lowboy, rock truck, or yarding equipment.   |
| <b>Critical Vehicle</b>           | The largest vehicle (by weight, size or unique shape) whose limited use on the road is necessary to complete the planned activity.  |
| <b>Traffic Service Level</b>      | Values are A, B, C, and D (A = Highest; D = Lowest).  |
| <b>Highway Safety Act</b>         | Road open to general public without restrictive gates, prohibitive signs, or regulation other than restrictions based on size, weight, or class of registration; Yes or No.   |
| <b>Maintenance Levels</b>         | Levels 1 through 5:<br>Level 1 - Closed, basic drainage maintenance;<br>Level 2 - High Clearance Vehicles;<br>Level 3 - All Vehicles, low user comfort;<br>Level 4 - All Vehicles, moderate user comfort;<br>Level 5 - All Vehicles, high user comfort. |
| <b>Intended Purpose</b>           | Brief description of why this road is needed.   |
| <b>Travel Management Strategy</b> | Several values apply; see the Travelway Classification/Operation Guide.   |

Figure A-3  
Crystal Creek Project Area  
Transportation Plan

# Legend

-  Crystal Creek Project Area Boundary
-  Existing Permanent Roads
-  Existing Closed Roads
-  All Proposed Permanent Roads\*
-  All Proposed Temporary Roads\*
-  Shoreline, Lakes, Class I/II Streams
-  Existing Managed Stands
-  All Proposed Harvest Units\*
-  Saltwater
-  Wilderness
-  Non-National Forest Lands

\*Each Alternative proposes to develop only a portion of the roads and units shown.



0 7920 15840  
Scale is 1 inch = 7920 feet

map: /gis/projects/crystal/plots/feisplots/trans\_plan.map 10/20/98  
macros: feismap.aml, trans\_plan.aml





Figure A-4  
Proposed Temporary Road Closures



- Low-Site Forest
  - Productive Forest
  - Non-NF Lands
  - Managed Stands
  - Freshwater
  - Saltwater
  - Streams
  - Highways
  - All
  - High
- Closed Roads
  - Closed Non-System Roads
  - Planned System Roads
  - Non-NF Roads
  - Contour Interval: 100 ft
  - Closure of Existing Spur

0 3478 6956  
Scale is 1 inch = 3478 feet







## EXISTING ROAD DESCRIPTION

|   |   |
|---|---|
| <b>Road Number:</b> 6100                          | <b>Road Name:</b> Mud                     |
| <b>Termini:</b> Junction Rd<br>6252 to Section 21 | <b>Entry Cycle:</b> Constant              |
| <b>Length (miles):</b> 3.03                       | <b>VCU:</b> 487                           |
| <b>Functional Class/Travel Class:</b> Local / 5   | <b>Width (ft):</b> 14                     |
|   | <b>Design Vehicle:</b> Logging Truck      |
| <b>Service Life:</b> Long Term                    | <b>Critical Vehicle:</b> Logging Truck    |
| <b>Traffic Service Level:</b> C                   | <b>Highway Safety Act:</b> Yes            |
| <b>Maintenance Levels -----</b>                   | <b>Operational:</b> 3 <b>Objective:</b> 3 |

**Intended Purpose:** This road was constructed to access earlier logging activities and provide forest management access.

### Travelway Management Prescription

This road is designed as a single lane with some turnouts. The surface is maintained to protect the environment and economic investment.

Any or all modes of travel may be prohibited on a seasonal basis to protect resources or to feature a particular use.

The maintenance for this road will be active: Provide frequent cleanout of ditches and catchbasins to assure controlled drainage. Control roadside brush. Grade as needed to maintain crown and running surface.

### Travelway Management Strategies

|                    |   |
|--------------------|---|
| <b>Encourage:</b>  | All licensed vehicles, bicycles, hikers |
| <b>Accept:</b>     | Off highway vehicles, ATVs              |
| <b>Discourage:</b> | N/A                                     |
| <b>Prohibit:</b>   | Public traffic during commercial use    |
| <b>Eliminate:</b>  | N/A                                     |

***RESOURCE CONSIDERATIONS AND MITIGATIONS***  
***ROAD: 6100***

**Wildlife Biodiversity:**

A portion of the existing road crosses or borders the Point Agassiz small Old-Growth Habitat Reserve as designed in alternatives 3 and 6. Maintain old-growth habitat features along the road where this occurs.



## EXISTING ROAD DESCRIPTION

|   |                                      |  |
|---|--------------------------------------|--|
| <b>Road Number:</b> 6101                        | <b>Road Name:</b> Patterson River    |  |
| <b>Termini:</b> Junction Rd 6256 to Section 1   |                                      | <b>Entry Cycle:</b> Constant           |
| <b>Length (miles):</b> 3.49                     | <b>VCU:</b> 487                      |  |
| <b>Functional Class/Travel Class:</b> Local / 5 |                                      | <b>Width (ft):</b> 14                  |
|   | <b>Design Vehicle:</b> Logging Truck |  |
| <b>Service Life:</b> Long Term                  |                                      | <b>Critical Vehicle:</b> Logging Truck |
| <b>Traffic Service Level:</b> D                 | <b>Highway Safety Act:</b> No        |  |
| <b>Maintenance Levels</b> -----                 | <b>Operational:</b> 2                | <b>Objective:</b> 2                    |

**Intended Purpose:** This road was constructed to access earlier logging activities and provide forest management access.

### Travelway Management Prescription

This road is designed as a single lane with some turnouts. The surface is maintained to protect the environment and economic investment. The roadway entrance will be roughened to discourage low clearance vehicles.

Any or all modes of travel may be prohibited on a seasonal basis to protect resources or to feature a particular use.

The maintenance for this road will be to stormproof: Provide waterbars, rolling dips, outsloping, etc., to assure controlled runoff until need maintenance can be performed on the primary drainage system.

### Travelway Management Strategies

|                    |   |
|--------------------|---|
| <b>Encourage:</b>  | All licensed high clearance vehicles - bicycles, hikers |
| <b>Accept:</b>     | Off highway vehicles                                    |
| <b>Discourage:</b> | Standard passenger vehicles                             |
| <b>Prohibit:</b>   | Public traffic during commercial use                    |
| <b>Eliminate:</b>  | N/A   |

***RESOURCE CONSIDERATIONS AND MITIGATIONS***  
***ROAD: 6101***

**Watershed/Fisheries:**

The road crosses on Class I stream at milepost 1.05. Replace the log stringer bridge during reconstruction of the road.

Timing: Prohibit in-stream disturbance from August 1 through June 15.

## EXISTING ROAD DESCRIPTION

|   |                                      |  |
|---|--------------------------------------|--|
| <b>Road Number:</b> 6103                        | <b>Road Name:</b> Pirate's Peak      |  |
| <b>Termini:</b> Thomas Bay to Section 6         |                                      | <b>Entry Cycle:</b> Constant           |
| <b>Length (miles):</b> 3.87                     | <b>VCU:</b> 487                      |  |
| <b>Functional Class/Travel Class:</b> Local / 7 |                                      | <b>Width (ft):</b> 14                  |
|   | <b>Design Vehicle:</b> Logging Truck |  |
| <b>Service Life:</b> Long Term                  |                                      | <b>Critical Vehicle:</b> Logging Truck |
| <b>Traffic Service Level:</b> D                 | <b>Highway Safety Act:</b> No        |  |
| <b>Maintenance Levels</b> -----                 | <b>Operational:</b> Abandoned        | <b>Objective:</b> Storage              |

**Intended Purpose:** This road was constructed to access earlier logging activities and provide forest management access.

### Travelway Management Prescription

This road was designed as a single lane with some turnouts. The road currently is closed to all passenger/pickup sized vehicles. ADF&G cleared the road on State land in 1998 by clearing alder and other trees from the right-of-way in order to enhance moose forage.

Any or all modes of travel may be prohibited on a seasonal basis to protect resources or to feature a particular use.

The maintenance for this road will be storage: Remove or bypass all drainage structures to restore natural drainage patterns, add waterbars as needed to control runoff, re-vegetate.

### Travelway Management Strategies

|                    |                        |
|--------------------|------------------------|
| <b>Encourage:</b>  | Bicycles, hikers       |
| <b>Accept:</b>     | ATVs                   |
| <b>Discourage:</b> | Off highway vehicles   |
| <b>Prohibit:</b>   | N/A                    |
| <b>Eliminate:</b>  | Highway class vehicles |

***RESOURCE CONSIDERATIONS AND MITIGATIONS***  
***ROAD: 6103***

No concerns.



## EXISTING ROAD DESCRIPTION

|   |  |  |                     |
|---|--|--|---------------------|
| <b>Road Number:</b> 6252                            |  | <b>Road Name:</b> Point Agassiz        |                     |
| <b>Termini:</b> Point Agassiz to 6256               |  | <b>Entry Cycle:</b> Constant           |                     |
| <b>Length (miles):</b> 4.14                         |  | <b>VCU:</b> 487                        |                     |
| <b>Functional Class/Travel Class:</b> Collector / 4 |  | <b>Width (ft):</b> 14                  |                     |
|   |  | <b>Design Vehicle:</b> Passenger Car   |                     |
| <b>Service Life:</b> Long Term                      |  | <b>Critical Vehicle:</b> Logging Truck |                     |
| <b>Traffic Service Level:</b> C                     |  | <b>Highway Safety Act:</b> Yes         |                     |
| <b>Maintenance Levels</b> -----                     |  | <b>Operational:</b> 3                  | <b>Objective:</b> 3 |

**Intended Purpose:** This road was constructed to access earlier logging activities and provide forest management access.

### Travelway Management Prescription

This road was designed as a single lane with some turnouts. Except during scheduled periods, extreme weather conditions, or emergencies this road is open to the general public for use by a standard passenger auto, without restrictive gates or prohibitive signs or regulations, other than general traffic control or restrictions based on size, weight, or class of registration.

The maintenance for this road will be active: Provide frequent cleanout of ditches and catchbasins to assure controlled drainage. Control roadside brush. Grade as needed to maintain crown and running surface.

### Travelway Management Strategies

|                    |   |
|--------------------|---|
| <b>Encourage:</b>  | All licensed vehicles, bicycles, hikers |
| <b>Accept:</b>     | ATVs, Off-highway vehicles              |
| <b>Discourage:</b> | N/A                                     |
| <b>Prohibit:</b>   | N/A                                     |
| <b>Eliminate:</b>  | N/A                                     |

***RESOURCE CONSIDERATIONS AND MITIGATIONS***  
***ROAD: 6252***

**Wildlife Biodiversity:**

A portion of the existing road crosses the Point Agassiz small Old-Growth Habitat Reserve in all alternatives. Maintain old-growth habitat features on both sides of the road where this occurs.

## EXISTING ROAD DESCRIPTION

|   |  |                                      |                     |
|---|--|--------------------------------------|---------------------|
| <b>Road Number:</b> 6256                            |  | <b>Road Name:</b> Muddy River        |                     |
| <b>Termini:</b> LTF - MP 1.18                       |  | <b>Entry Cycle:</b> Constant         |                     |
| <b>Length (miles):</b> 1.18                         |  | <b>VCU:</b> 487                      |                     |
| <b>Functional Class/Travel Class:</b> Collector / 4 |  | <b>Width (ft):</b> 20                |                     |
|   |  | <b>Design Vehicle:</b> Passenger Car |                     |
| <b>Service Life:</b> Long Term                      |  | <b>Critical Vehicle:</b> Lowboy      |                     |
| <b>Traffic Service Level:</b> B                     |  | <b>Highway Safety Act:</b> Yes       |                     |
| <b>Maintenance Levels</b> -----                     |  | <b>Operational:</b> 4                | <b>Objective:</b> 3 |

**Intended Purpose:** This road was constructed to access earlier logging activities and provide forest management access. The road has been widened over time. Gravel trucks hauling from the the quarry at MP 1.18 dominate current use.

### Travelway Management Prescription

This road was designed as a single lane with some turnouts. The surface is maintained to protect the environment and economic investment. Except during scheduled periods, extreme weather conditions, or emergencies, this road is to remain open to the general public for use by a standard passenger auto, without restrictive gates or prohibitive signs or regulations, other than general traffic control or restrictions based on size, weight, or class of registration.

The maintenance for this road will be active: Provide frequent cleanout of ditches and catchbasins to assure controlled drainage. Control roadside brush. Grade as needed to maintain crown and running surface.

### Travelway Management Strategies

|                    |  |
|--------------------|--|
| <b>Encourage:</b>  | All licensed highway passenger vehicles - bicycles, hikers |
| <b>Accept:</b>     | Off highway vehicles                                       |
| <b>Discourage:</b> | N/A  |
| <b>Prohibit:</b>   | N/A  |
| <b>Eliminate:</b>  | N/A  |

***RESOURCE CONSIDERATIONS AND MITIGATIONS***

***ROAD: 6256 (LTF – M.P. 1.18)***

No concerns.



## EXISTING ROAD DESCRIPTION

|   |                                      |
|---|--------------------------------------|
| <b>Road Number:</b> 6256                            | <b>Road Name:</b> Muddy River        |
| <b>Termini:</b> M.P. 1.18 - M.P. 5.91               | <b>Entry Cycle:</b> Constant         |
| <b>Length (miles):</b> 4.73                         | <b>VCU:</b> 487                      |
| <b>Functional Class/Travel Class:</b> Collector / 4 | <b>Width (ft):</b> 16                |
|   | <b>Design Vehicle:</b> Passenger Car |
| <b>Service Life:</b> Long Term                      | <b>Critical Vehicle:</b> Lowboy      |
| <b>Traffic Service Level:</b> C                     | <b>Highway Safety Act:</b> Yes       |
| <b>Maintenance Levels</b> -----                     | <b>Operational:</b> 3                |
|   | <b>Objective:</b> 3                  |

**Intended Purpose:** This road was constructed to access earlier logging activities and provide forest management access.

### Travelway Management Prescription

This road was designed as a single lane with some turnouts. The surface is maintained to protect the environment and economic investment. Except during scheduled periods, extreme weather conditions, or emergencies, this road is to remain open to the general public for use by a standard passenger auto, without restrictive gates or prohibitive signs or regulations, other than general traffic control or restrictions based on size, weight, or class of registration.

The maintenance for this road will be active: Provide frequent cleanout of ditches and catchbasins to assure controlled drainage. Control roadside brush. Grade as needed to maintain crown and running surface.

### Travelway Management Strategies

|                    |  |
|--------------------|--|
| <b>Encourage:</b>  | All licensed passenger vehicles - bicycles, hikers |
| <b>Accept:</b>     | Off highway vehicles                               |
| <b>Discourage:</b> | N/A  |
| <b>Prohibit:</b>   | N/A  |
| <b>Eliminate:</b>  | N/A  |

## ***RESOURCE CONSIDERATION AND MITIGATIONS***

### **ROAD: 6256 (M.P. 1.18 – M.P. 5.91)**

#### **Watershed/Fisheries:**

This segment of road 6256 parallels the Muddy River. Replace culvert at approximate milepost 3.1 during wetland enhancement of Class I crossing.

Timing: Prohibit in-stream disturbance of Class I stream from August 15 through May 15.

#### **Wildlife Biodiversity:**

North of the road at about Milepost 3.3 is a large pond and muskeg area that is used by ducks, geese, and swans. Maintain vegetation along this segment of the road to screen traffic from the wetland area.

#### **Rock Borrow Sites:**

There are several existing gravel borrow pits in the area.

## PLANNED ROAD DESCRIPTION

|   |  |
|---|--|
| <b>Road Number:</b> 6256                        | <b>Road Name:</b> Muddy River          |
| <b>Termini:</b> M.P. 5.91 to M.P. 7.48          | <b>Entry Cycle:</b> Intermittent       |
| <b>Length (miles):</b> 1.57                     | <b>VCU:</b> 487                        |
| <b>Functional Class/Travel Class:</b> Local / 5 | <b>Width (ft):</b> 14                  |
|   | <b>Design Vehicle:</b> Logging Truck   |
| <b>Service Life:</b> Long Term                  | <b>Critical Vehicle:</b> Logging Truck |
| <b>Traffic Service Level:</b> D                 | <b>Highway Safety Act:</b> No          |
| <b>Maintenance Levels -----</b>                 | <b>Operational:</b> 3                  |
|   | <b>Objective:</b> 3                    |

**Intended Purpose:** This road will be constructed to access logging activities and provide forest management access.

### Travelway Management Prescription

This road was designed as a single lane with some turnouts. The surface is maintained to protect the environment and economic investment. Any or all modes of travel may be prohibited on a seasonal basis to protect resources or to feature a particular use.

The maintenance for this road will be active: Provide frequent cleanout of ditches and catchbasins to assure controlled drainage. Control roadside brush. Grade as needed to maintain crown and running surface.

### Travelway Management Strategies

|                    |  |
|--------------------|--|
| <b>Encourage:</b>  | High clearance vehicles - bicycles, hikers |
| <b>Accept:</b>     | Off highway vehicles                       |
| <b>Discourage:</b> | Low clearance vehicles                     |
| <b>Prohibit:</b>   | Public traffic during commercial use.      |
| <b>Eliminate:</b>  | N/A  |

## ***RESOURCE CONSIDERATIONS AND MITIGATIONS***

***ROAD: 6256 (M.P. 5.91 – M.P. 7.48)***

### **Watershed/Fisheries:**

The road is directly adjacent to wetlands at 2 different locations approximately 300' long each.

To mitigation measures, we will plant trees on fill-slope of road to screen wetlands. No timing restrictions.

Fish Timing: Restrict road construction during August 15 through May 15.

### **Wildlife Biodiversity:**

Swans are known to use the wetlands during spring, fall and mild winters. Road construction will leave as much shrub and tree cover as possible between the road and the marsh. Where the road is visible from the wetlands, alder or other suitable vegetation will be planted to screen traffic.

Timing: Road construction and right-of-way clearing will be prohibited from October 15 to April 15 between Milepost 5.9 and 7.5 (the stretch of road that is being re-routed). We will monitor to see if swans continue to use the wetlands after construction. If swans avoid the area due to disturbance, seasonal restrictions on road traffic may be warranted.

### **Major Stream Crossings:**

|                 |            |
|-----------------|------------|
| Mile Post       | 6.0        |
| Stream Class    | I          |
| Structure       | 60' Bridge |
| Stream Width    | 20'        |
| Stream Depth    | <2'        |
| Substrate       | Fine       |
| Bank Height     | <3'        |
| Fish Habitat    | Rearing    |
| Stream Gradient | 1%         |



## EXISTING ROAD DESCRIPTION

|   |                                      |  |
|---|--------------------------------------|--|
| <b>Road Number:</b> 6256                        | <b>Road Name:</b> Muddy River        |  |
| <b>Termini:</b> M.P. 7.48 to M.P. 10.06         |                                      | <b>Entry Cycle:</b> Intermittent       |
| <b>Length (miles):</b> 2.58                     | <b>VCU:</b> 487                      |  |
| <b>Functional Class/Travel Class:</b> Local / 5 |                                      | <b>Width (ft):</b> 14                  |
|   | <b>Design Vehicle:</b> Logging Truck |  |
| <b>Service Life:</b> Long Term                  |                                      | <b>Critical Vehicle:</b> Logging Truck |
| <b>Traffic Service Level:</b> D                 | <b>Highway Safety Act:</b> No        |  |
| <b>Maintenance Levels</b> -----                 | <b>Operational:</b> 2                | <b>Objective:</b> 2                    |

**Intended Purpose:** This road was constructed to access earlier logging activities and provide forest management access.

### Travelway Management Prescription

This road was designed as a single lane with some turnouts. The surface is maintained to protect the environment and economic investment. Any or all modes of travel may be prohibited on a seasonal basis to protect resources or to feature a particular use. This segment is currently closed. The bridge over the North Fork Muddy River was removed.

The maintenance for this road will be to storm proof. Provide waterbars, rolling dips, outsloping, etc., to assure controlled runoff until needed maintenance can be performed on the primary drainage system.

### Travelway Management Strategies

|                    |   |
|--------------------|---|
| <b>Encourage:</b>  | All licensed high clearance vehicles - bicycles, hikers |
| <b>Accept:</b>     | Off highway vehicles                                    |
| <b>Discourage:</b> | Standard passenger vehicles                             |
| <b>Prohibit:</b>   | Public traffic during commercial use                    |
| <b>Eliminate:</b>  | N/A   |

## ***RESOURCE CONSIDERATIONS AND MITIGATIONS***

***ROAD: 6256 (M.P. 7.48 -- M.P. 10.06)***

### **Wildlife Biodiversity:**

The forest by Milepost 7.8 has been identified as providing old-growth connectivity between the medium old-growth habitat reserve north of the project area and the large old-growth habitat reserve in the Stikine/LeConte Wilderness Area to the south. Maintain at least a 500' wide corridor of old-growth habitat on both sides of the road by this milepost. Prohibit the construction of pullouts within this corridor.

There is a waterfowl marsh near Milepost 7.0 that is used seasonally by swans.

Timing: Road reconstruction will be prohibited from October 15 to April 15 between Milepost 7.5 and 7.9.

## EXISTING ROAD DESCRIPTION

|   |  |  |                           |
|---|--|--|---------------------------|
| <b>Road Number:</b> 6256                        |  | <b>Road Name:</b> Muddy River          |                           |
| <b>Termini:</b> M.P. 10.06 to M.P. 13.10 (end)  |  | <b>Entry Cycle:</b> Intermittent       |                           |
| <b>Length (miles):</b> 3.04                     |  | <b>VCU:</b> 487                        |                           |
| <b>Functional Class/Travel Class:</b> Local / 5 |  | <b>Width (ft):</b> 14                  |                           |
|   |  | <b>Design Vehicle:</b> Logging Truck   |                           |
| <b>Service Life:</b> Long Term                  |  | <b>Critical Vehicle:</b> Logging Truck |                           |
| <b>Traffic Service Level:</b> D                 |  | <b>Highway Safety Act:</b> No          |                           |
| <b>Maintenance Levels</b> -----                 |  | <b>Operational:</b> 2                  | <b>Objective:</b> Storage |

**Intended Purpose:** This road was constructed to access earlier logging activities and provide forest management access.

### Travelway Management Prescription

This road was designed as a single lane with some turnouts. The surface is maintained to protect the environment and economic investment. Any or all modes of travel may be prohibited on a seasonal basis to protect resources or to feature a particular use. This segment is currently closed.

The maintenance for this road will be storage: Remove or by-pass all drainage structures to restore natural drainage patterns, add waterbars as needed to control runoff, re-vegetate.

### Travelway Management Strategies

|                    |   |
|--------------------|---|
| <b>Encourage:</b>  | Bicycles, hikers and other non-motorized transportation |
| <b>Accept:</b>     | All terrain vehicles                                    |
| <b>Discourage:</b> | Off highway vehicles                                    |
| <b>Prohibit:</b>   | N/A   |
| <b>Eliminate:</b>  | N/A   |

***RESOURCE CONSIDERATIONS AND MITIGATIONS***

***ROAD: 6256 (M.P. 10.06 to M.P. 13.10 end)***

No concerns.



## PLANNED ROAD DESCRIPTIONS

|   |                               |  |
|---|-------------------------------|--|
| <b>Road Number:</b> 44900                       |                               | <b>Road Name:</b> Terminal             |
| <b>Termini:</b> MP 0.5 Road 6256 to M.P. 1.15   |                               | <b>Entry Cycle:</b> Intermittent       |
| <b>Length (miles):</b> 1.15                     | <b>VCU:</b> 487               |  |
| <b>Functional Class/Travel Class:</b> Local / 7 |                               | <b>Width (ft):</b> 14                  |
| <b>Design Vehicle:</b> Logging Truck            |                               |  |
| <b>Service Life:</b> Long Term                  |                               | <b>Critical Vehicle:</b> Logging Truck |
| <b>Traffic Service Level:</b> D                 | <b>Highway Safety Act:</b> No |  |
| <b>Maintenance Levels</b> -----                 | <b>Operational:</b> 2         | <b>Objective:</b> 2                    |

**Intended Purpose:** This road provides forest management access. A log sort yard is proposed on National Forest property at approximate milepost 0.50

Approximately 0.49 miles of existing spur road will be upgraded to specified road.

### Travelway Management Prescription

This road will be designed as a single lane with some turnouts. The surface is maintained to protect the environment and economic investment.

The maintenance for this road will be to storm proof. Provide waterbars, rolling dips, outsloping, etc., to assure controlled runoff until needed maintenance can be performed on the primary drainage system.

### Travelway Management Strategies

|                    |   |
|--------------------|---|
| <b>Encourage:</b>  | All licensed high clearance vehicles - bicycles, hikers |
| <b>Accept:</b>     | Off highway vehicles                                    |
| <b>Discourage:</b> | Standard passenger vehicles                             |
| <b>Prohibit:</b>   | Public traffic during commercial use                    |
| <b>Eliminate:</b>  | N/A   |

## ***RESOURCE CONSIDERATIONS AND MITIGATIONS***

**Road: 44900 (M.P. 0.0 – M.P. 1.15)**

### **Watershed/Fisheries:**

No timing restrictions.

### **Wildlife Biodiversity:**

Vancouver Canada geese nest on the larger ponds and surrounding forests north of the proposed road.

Timing: Restrict road construction during April 1 through June 30 on that segment of road from the edge of the existing clearcut, milepost 0.85, to the stream at milepost 1.15.

**Rock Borrow Sites:** The road traverses adjacent to a terminal moraine from milepost 0.85 to milepost 2.2. Composition is mostly granite boulders but there is some shale type material.

## PLANNED ROAD DESCRIPTIONS

|   |  |  |                           |
|---|--|--|---------------------------|
| <b>Road Number:</b> 44900                       |  | <b>Road Name:</b> Terminal             |                           |
| <b>Termini:</b> MP 1.15 Road 44900 to M.P. 2.58 |  | <b>Entry Cycle:</b> Intermittent       |                           |
| <b>Length (miles):</b> 1.43                     |  | <b>VCU:</b> 487                        |                           |
| <b>Functional Class/Travel Class:</b> Local / 7 |  | <b>Width (ft):</b> 14                  |                           |
| <b>Design Vehicle:</b> Logging Truck            |  |  |                           |
| <b>Service Life:</b> Long Term                  |  | <b>Critical Vehicle:</b> Logging Truck |                           |
| <b>Traffic Service Level:</b> D                 |  | <b>Highway Safety Act:</b> No          |                           |
| <b>Maintenance Levels</b> -----                 |  | <b>Operational:</b> 2                  | <b>Objective:</b> Storage |

**Intended Purpose:** This road provides forest management access. It will be not be needed for timber management within the foreseeable future and will be placed in storage after proposed use is completed.

### Travelway Management Prescription

This road will be designed as a single lane with some turnouts. The surface is maintained to protect the environment and economic investment.

The maintenance for this road will be storage: Remove or by-pass all drainage structures to restore natural drainage patterns, add waterbars as needed to control runoff, re-vegetate. Remove temporary bridges at Milepost 1.15 and 2.00.

### Travelway Management Strategies

|                    |   |
|--------------------|---|
| <b>Encourage:</b>  | Bicycles, hikers and other non-motorized transportation |
| <b>Accept:</b>     | All Terrain Vehicles                                    |
| <b>Discourage:</b> | N/A   |
| <b>Prohibit:</b>   | Public traffic during commercial use                    |
| <b>Eliminate:</b>  | Unauthorized motorized vehicles when in storage         |

## **RESOURCE CONSIDERATIONS AND MITIGATIONS**

**Road: 44900 (M.P. 1.15 – M.P. 2.58)**

### **Watershed/Fisheries:**

There are two areas where the road crosses muskeg. The first area the road skirts along the tree fringe (approximately 300 feet) of a small muskeg and a series of small ponds. This location avoids a 15 to 20 foot through-cut in a terminal moraine. At the second area the road skirts along the edge of a small muskeg for approximately 200 feet to avoid steep grades.

The road crosses one Class I stream at approximate milepost 1.15 and one Class II stream at approximate M.P. 2.00.

Timing: Prohibit in-stream disturbance, on both streams, from August 15 through May 15.

### **Wildlife Biodiversity:**

Vancouver Canada geese nest on the larger ponds and surrounding forests north of the proposed road.

Timing: Restrict road construction during April 1 through June 30 on that segment of road from the edge of the existing clearcut, milepost 0.85, to the stream at milepost 1.15.

**Rock Borrow Sites:** The road traverses adjacent to a terminal moraine from milepost 0.85 to milepost 2.2. Composition is mostly granite boulders but there is some shale type material.

### **Major Stream Crossings:**

|                        |                    |                    |
|------------------------|--------------------|--------------------|
| <b>Mile Post</b>       | 1.15               | 2.00               |
| <b>Stream Class</b>    | I                  | II                 |
| <b>Structure</b>       | 30' Bridge         | 12' Bridge         |
| <b>Stream Width</b>    | 20'                | 8'                 |
| <b>Stream Depth</b>    | 3'                 | < 1'               |
| <b>Substrate</b>       | Gravel/Cobbles/Mud | Gravel/Cobbles/Mud |
| <b>Bank Height</b>     | < 3'               | < 3'               |
| <b>Fish Habitat</b>    | Rearing            | Rearing            |
| <b>Stream Gradient</b> | < 3%               | 5%                 |



## PLANNED ROAD DESCRIPTIONS

|   |  |  |                           |
|---|--|--|---------------------------|
| <b>Road Number:</b> 44905                       |  | <b>Road Name:</b> Hog Back             |                           |
| <b>Termini:</b> Road 6101 - Sec. 13             |  | <b>Entry Cycle:</b> Intermittent       |                           |
| <b>Length (miles):</b> 1.68                     |  | <b>VCU:</b> 487                        |                           |
| <b>Functional Class/Travel Class:</b> Local / 7 |  | <b>Width (ft):</b> 14                  |                           |
|   |  | <b>Design Vehicle:</b> Logging Truck   |                           |
| <b>Service Life:</b> Long Term                  |  | <b>Critical Vehicle:</b> Logging Truck |                           |
| <b>Traffic Service Level:</b> D                 |  | <b>Highway Safety Act:</b> No          |                           |
| <b>Maintenance Levels</b> -----                 |  | <b>Operational:</b> 2                  | <b>Objective:</b> Storage |

**Intended Purpose:** This road provides forest management access. It will be not be needed for timber management in the next ten years and will be placed in storage after proposed use is completed.

### Travelway Management Prescription

This road will be designed as a single lane with some turnouts. The surface is maintained to protect the environment and economic investment.

The maintenance for this road will be storage: Remove or by-pass all drainage structures to restore natural drainage patterns, add waterbars as need to control runoff, re-vegetate. The bridge at Milepost 0.15 will be a temporary bridge.

### Travelway Management Strategies

|                    |   |
|--------------------|---|
| <b>Encourage:</b>  | Non-motorized traffic - bicycles, hikers        |
| <b>Accept:</b>     | All Terrain Vehicles                            |
| <b>Discourage:</b> | N/A   |
| <b>Prohibit:</b>   | Public traffic during commercial use            |
| <b>Eliminate:</b>  | Unauthorized motorized vehicles when in storage |

## ***RESOURCE CONSIDERATIONS AND MITIGATIONS***

### **Road: 44905**

#### **Watershed/Fisheries:**

The road crosses one Class I stream.

Timing: Prohibit in-stream disturbance from August 1 through June 15.

**Rock Borrow Sites:** The road traverses along the top of a small ridge. There are rock outcrops and bluffs along this ridge.

#### **Major Stream Crossings:**

|                        |            |
|------------------------|------------|
| <b>Mile Post</b>       | 0.15       |
| <b>Stream Class</b>    | I          |
| <b>Structure</b>       | 20' Bridge |
| <b>Stream Width</b>    | 8'         |
| <b>Stream Depth</b>    | < 1'       |
| <b>Substrate</b>       | Mud        |
| <b>Bank Height</b>     | < 3'       |
| <b>Fish Habitat</b>    | Rearing    |
| <b>Stream Gradient</b> | < 3%       |

## PLANNED ROAD DESCRIPTIONS

|   |                                      |  |
|---|--------------------------------------|--|
| <b>Road Number:</b> 44908                       | <b>Road Name:</b> Ess                |  |
| <b>Termini:</b> 6101 - Sec 7                    |                                      | <b>Entry Cycle:</b> Intermittent       |
| <b>Length (miles):</b> 2.57                     | <b>VCU:</b> 487                      |  |
| <b>Functional Class/Travel Class:</b> Local / 7 |                                      | <b>Width (ft):</b> 14                  |
|   | <b>Design Vehicle:</b> Logging Truck |  |
| <b>Service Life:</b> Long Term                  |                                      | <b>Critical Vehicle:</b> Logging Truck |
| <b>Traffic Service Level:</b> D                 | <b>Highway Safety Act:</b> No        |  |
| <b>Maintenance Levels</b> -----                 | <b>Operational:</b> 2                | <b>Objective:</b> Storage              |

**Intended Purpose:** This road provides forest management access. It will be not be needed for timber management within the next ten years and will be placed in storage after proposed use is completed.

Approximately 0.49 miles of existing spur road will be upgraded to specified road.

### Travelway Management Prescription

This road will be designed as a single lane with some turnouts. The surface is maintained to protect the environment and investment.

The maintenance for this road is storage: Remove or by-pass all drainage structures to restore natural drainage patterns, add waterbars as needed to control runoff, re-vegetate.

### Travelway Management Strategies

|                    |   |
|--------------------|---|
| <b>Encourage:</b>  | Non motorized traffic - bicycles, hikers        |
| <b>Accept:</b>     | All Terrain Vehicles                            |
| <b>Discourage:</b> | N/A   |
| <b>Prohibit:</b>   | Public traffic during commercial use            |
| <b>Eliminate:</b>  | Unauthorized motorized vehicles when in storage |

## **RESOURCE CONSIDERATION AND MITIGATIONS**

### **ROAD: 44908**

#### **Watershed/Fisheries:**

The road crosses no muskegs but at mileposts 1.05 and 1.60 it skirts around the edges of two muskegs.

No timing restrictions for fisheries.

#### **Wildlife Biodiversity:**

At approximate mile post 1.25 there is a beaver pond complex that is waterfowl nesting habitat. The forest between proposed Units 24 and 25 has been identified as providing old-growth connectivity between the medium old-growth habitat reserve north of the project area and the large old-growth habitat reserve in the Stikine/Le Conte Wilderness Area to the south. Maintain old-growth habitat on both sides of the road between these units. Keep the right-of-way clearing as narrow as feasible and prohibit the construction of pullouts along this short stretch of road.

Timing: Restrict road construction during April 1 through June 30 from mile post 1.05 to mile post 1.75.

**Rock Borrow Sites:** There is an abundance of rock along this route.

#### **Erosion Control:**

There are areas of full bench cut on rock sideslopes that will require end haul. There are several road grade pitches that are near or at the maximum 20% grade. There are several through cuts on rocky hogback ridges.

#### **Major Stream Crossings:**

| <b>Mile Post</b>       | 0.35    | 1.25         | 1.70    | 2.00    |
|------------------------|---------|--------------|---------|---------|
| <b>Stream Class</b>    | II      | III          | III     | III     |
| <b>Structure</b>       | 48" CMP | 2 - 48" CMPs | 48" CMP | 36" CMP |
| <b>Stream Width</b>    | 3'      | 6'           | < 3'    | < 2'    |
| <b>Stream Depth</b>    | < 1'    | < 1'         | < 1'    | < 1'    |
| <b>Substrate</b>       | Mud     | Mud          | Bedrock | Bedrock |
| <b>Bank Height</b>     | < 2'    | < 2'         | < 3'    | < 3'    |
| <b>Fish Habitat</b>    | Rearing | N/A          | N/A     | N/A     |
| <b>Stream Gradient</b> | < 5%    | < 3%         | > 10%   | > 10%   |



## PLANNED ROAD DESCRIPTIONS

|   |  |  |                           |
|---|--|--|---------------------------|
| <b>Road Number:</b> 44920                       |  | <b>Road Name:</b> Crystal Creek        |                           |
| <b>Termini:</b> 6256 - Section 7                |  | <b>Entry Cycle:</b> Intermittent       |                           |
| <b>Length (miles):</b> 4.02                     |  | <b>VCU:</b> 487                        |                           |
| <b>Functional Class/Travel Class:</b> Local / 7 |  | <b>Width (ft):</b> 14                  |                           |
|   |  | <b>Design Vehicle:</b> Logging Truck   |                           |
| <b>Service Life:</b> Long Term                  |  | <b>Critical Vehicle:</b> Logging Truck |                           |
| <b>Traffic Service Level:</b> D                 |  | <b>Highway Safety Act:</b> No          |                           |
| <b>Maintenance Levels</b> -----                 |  | <b>Operational:</b> 2                  | <b>Objective:</b> Storage |

**Intended Purpose:** This road provides forest management access. It will not be needed for timber management access within the next ten years and will be placed in storage after proposed use is completed.

Approximately 1.51 miles of existing spur road will be upgraded to specified road.

### Travelway Management Prescription

This road will be designed as a single lane with some turnouts. The surface is maintained to protect the environment and economic investment.

The maintenance for this road will be storage: Remove or by-pass all drainage structures to restore natural drainage patterns, add waterbars as need to control runoff, re-vegetate.

The temporary bridges at M.P. 1.60 and M.P. 2.80 will be pulled after timber harvest to protect soil and water resources.

### Travelway Management Strategies

|                    |   |
|--------------------|---|
| <b>Encourage:</b>  | Bicycles, hikers and other non-motorized transportation |
| <b>Accept:</b>     | N/A   |
| <b>Discourage:</b> | All motorized traffic                                   |
| <b>Prohibit:</b>   | Public traffic during commercial use                    |
| <b>Eliminate:</b>  | All motorized traffic                                   |

## **RESOURCE CONDITIONS AND MITIGATIONS**

### **ROAD: 44920**

**Watershed/Fisheries:** There are four fish stream crossings: Muddy River, Unnamed Creek, Crystal Creek and Clear Creek (M.P. 0.4, 0.65, 1.15, and 1.60 respectively).

**Timing:** Prohibit in-stream disturbance from August 15 through June 30 on Unnamed Creek, Crystal Creek and Clear Creek. Exception: Allow 1 in-stream per crossing from July 18 through Aug. 1, but a fish biologist needs to be present and must notify ADF&G.

**Wildlife Biodiversity:** There is a concern about new road access causing increased vulnerability to mountain goats and wolves. The road will be closed to public motorized vehicular travel at the Muddy River crossing during logging and after logging.

There is a known great blue heron nest north of the road between proposed Units 70 and 76. If feasible, locate the road at least 600' from this nest. If the nest is active, road construction and right-of-way clearing will be prohibited during the period of March 1 to August 15 from the stream crossing on the south boundary of Unit 70 to the stream crossing on the south boundary of Unit 76.

There is a waterfowl marsh near Milepost 7.0 of Road 6256 that is used seasonally by swans.

**Timing:** Road reconstruction will be prohibited between October 15 and April 15 from Milepost 0.0 to 0.04.

**Rock Borrow Sites:** Rock sources are available at milepost 0.40, 0.50 and 1.45.

#### **Major Stream Crossings:**

| Mile Post    | 0.40           | 0.65    | 1.15        | 1.60       | 2.5     | 2.80       | 2.95    | 3.05    | 3.65       |
|--------------|----------------|---------|-------------|------------|---------|------------|---------|---------|------------|
| Stream Class | I              | II      | I           | I          | III     | III        | III     | III     | III        |
| Structure    | 130' Bridge    | 48" CMP | 70' Bridge  | 20' Bridge | 60" CMP | 20' Bridge | 60" CMP | 72" CMP | 20' Bridge |
| Stream Width | 80'            | 3'      | 50'         | 5'         | 5'      | 5'         | 5'      | 6'      | 7'         |
| Stream Depth | < 4'           | < 1'    | < 2'        | < 1'       | < 1'    | < 1'       | < 1'    | < 1'    | < 1'       |
| Substrate    | Bedrk / Cobble | Cobbles | Grav/cobble | Cobbles    | Cobbles | Cobbles    | Cobbles | Cobbles | Cobbles    |
| Bank Height  | 14'            | < 1'    | 15'         | < 5'       | < 5'    | > 5'       | > 5'    | > 5'    | > 10'      |
| Fish Habitat | Spawning       | N/A     | Spawn       | Rearing    | N/A     | N/A        | N/A     | N/A     | N/A        |
| Stream Grade | 5%             | < 10%   | < 4%        | < 5%       | > 15%   | > 10%      | > 10%   | > 10%   | > 10%      |

## PLANNED ROAD DESCRIPTIONS

|   |                                      |  |
|---|--------------------------------------|--|
| <b>Road Number:</b> 44921                       | <b>Road Name:</b> Clear Creek        |  |
| <b>Termini:</b> Road 44920 to Section 25        |                                      | <b>Entry Cycle:</b> Intermittent       |
| <b>Length (miles):</b> 2.14                     | <b>VCU:</b> 487                      |  |
| <b>Functional Class/Travel Class:</b> Local / 7 |                                      | <b>Width (ft):</b> 14                  |
|   | <b>Design Vehicle:</b> Logging Truck |  |
| <b>Service Life:</b> Long Term                  |                                      | <b>Critical Vehicle:</b> Logging Truck |
| <b>Traffic Service Level:</b> D                 | <b>Highway Safety Act:</b> No        |  |
| <b>Maintenance Levels</b> -----                 | <b>Operational:</b> 2                | <b>Objective:</b> Storage              |

**Intended Purpose:** This road provides forest management access. It will not be needed for timber management within ten years and will be placed in storage after proposed use is completed.

### Travelway Management Prescription

This road will be designed as a single lane with some turnouts. The surface is maintained to protect the environment and economic investment.

The maintenance for this road will be storage: Remove or by-pass all drainage structures to restore natural drainage patterns, add waterbars as needed to control runoff, re-vegetate. Remove temporary bridge at Milepost 0.56.

### Travelway Management Strategies

|                    |   |
|--------------------|---|
| <b>Encourage:</b>  | Non-motorized vehicles - bicycles, hikers |
| <b>Accept:</b>     | N/A                                       |
| <b>Discourage:</b> | N/A                                       |
| <b>Prohibit:</b>   | Public traffic during commercial use      |
| <b>Eliminate:</b>  | All motorized vehicles                    |

## ***RESOURCE CONDITIONS AND MITIGATIONS***

### **ROAD: 44921**

#### **Watershed/Fisheries:**

There is one Class II stream at approximate M.P. 0.56 and one Class III stream at approximate M.P. 1.46 that feed directly into a Class I stream. Road construction sediment is a concern.

No timing restrictions.

#### **Wildlife Biodiversity:**

There is a concern about new road access causing increased vulnerability to mountain goats and wolves. All roads will be closed to public motorized vehicular travel during logging and after logging.

#### **Rock Borrow Sites:**

A rock source is available at mileposts 0.40 and 1.25.

#### **Major Stream Crossings:**

|                        |                  |         |
|------------------------|------------------|---------|
| <b>Mile Post</b>       | 0.56             | 1.46    |
| <b>Stream Class</b>    | II               | III     |
| <b>Structure</b>       | 20' Bridge       | 48" CMP |
| <b>Stream Width</b>    | 10'              | 2'      |
| <b>Stream Depth</b>    | 2'               | 1'      |
| <b>Substrate</b>       | Gravel & Cobbles | Gravel  |
| <b>Bank Height</b>     | 4'               | 2'      |
| <b>Fish Habitat</b>    | Rearing/Spawning | N/A     |
| <b>Stream Gradient</b> | 3%               | 3%      |



## PLANNED ROAD DESCRIPTIONS

|   |                                      |  |
|---|--------------------------------------|--|
| <b>Road Number:</b> 44990                       | <b>Road Name:</b> Camp Two           |  |
| <b>Termini:</b> 6256 - Section 8                |                                      | <b>Entry Cycle:</b> Intermittent       |
| <b>Length (miles):</b> 1.36                     | <b>VCU:</b> 487                      |  |
| <b>Functional Class/Travel Class:</b> Local / 7 |                                      | <b>Width (ft):</b> 14                  |
|   | <b>Design Vehicle:</b> Logging Truck |  |
| <b>Service Life:</b> Long Term                  |                                      | <b>Critical Vehicle:</b> Logging Truck |
| <b>Traffic Service Level:</b> D                 | <b>Highway Safety Act:</b> No        |  |
| <b>Maintenance Levels</b> -----                 | <b>Operational:</b> 2                | <b>Objective:</b> Storage              |

**Intended Purpose:** This road provides forest management access.

### Travelway Management Prescription

This road will be designed as a single lane with some turnouts. The surface is maintained to protect the environment and economic investment.

The maintenance for this road will be storage: Remove or by-pass all drainage structures to restore natural drainage patterns, add waterbars as needed to control runoff, re-vegetate.

The temporary bridges at M.P. 0.65 and M.P. 1.00 will be pulled after timber harvest to protect soil and water resources.

### Travelway Management Strategies

|                    |   |
|--------------------|---|
| <b>Encourage:</b>  | Non-motorized traffic - bicycles, hikers        |
| <b>Accept:</b>     | N/A   |
| <b>Discourage:</b> | N/A   |
| <b>Prohibit:</b>   | Public traffic during commercial use            |
| <b>Eliminate:</b>  | Unauthorized motorized vehicles when in storage |

## **RESOURCE CONDITIONS AND MITIGATIONS**

### **ROAD: 44990**

#### **Watershed/Fisheries:**

There are two Class II streams that feed directly into the Muddy River. Road construction sediment is a concern.

No timing restrictions.

#### **Rock Borrow Sites:**

Rock is available on the south side of Muddy River.

#### **Major Stream Crossings:**

|                        |                  |            |            |         |
|------------------------|------------------|------------|------------|---------|
| <b>Mile Post</b>       | 0.40             | 0.65       | 1.00       | 1.20    |
| <b>Stream Class</b>    | I                | II         | II         | III     |
| <b>Structure</b>       | 100' Bridge      | 12' Bridge | 12' Bridge | 48" CMP |
| <b>Stream Width</b>    | 75'              | 4'         | 4'         | 3'      |
| <b>Stream Depth</b>    | < 5'             | < 1'       | < 1'       | < 1'    |
| <b>Substrate</b>       | Boulders/Cobbles | Cobbles    | Cobbles    | Bedrock |
| <b>Bank Height</b>     | < 10'            | 8'         | 7'         | 7'      |
| <b>Fish Habitat</b>    | Spawn/Rear       | N/A        | N/A        | N/A     |
| <b>Stream Gradient</b> | 5%               | >10%       | >10%       | > 15%   |

## PLANNED ROAD DESCRIPTIONS

|   |   |                           |
|---|---|---------------------------|
| <b>Road Number:</b> 44995                           | <b>Road Name:</b>                       |                           |
| <b>Termini:</b> Road 6256 to<br>M.P. 0.96           | <b>Entry Cycle:</b> Intermittent        |                           |
| <b>Length (miles):</b> 0.96                         | <b>VCU:</b> 487                         |                           |
| <b>Functional Class/Travel<br/>Class:</b> Local / 7 | <b>Width (ft):</b> 14                   |                           |
|   | <b>Design Vehicle:</b> Logging<br>Truck |                           |
| <b>Service Life:</b> Long Term                      | <b>Critical Vehicle:</b> Logging Truck  |                           |
| <b>Traffic Service Level:</b> D                     | <b>Highway Safety Act:</b> No           |                           |
| <b>Maintenance Levels</b> -----                     | <b>Operational:</b> 2                   | <b>Objective:</b> Storage |

**Intended Purpose:** This road provides forest management access.

### Travelway Management Prescription

This road will be designed as a single lane with some turnouts. The surface is maintained to protect the environment and investment.

The maintenance for this road will be storage: Remove or by-pass all drainage structures to restore natural drainage patterns, add waterbars as needed to control runoff, re-vegetate.

### Travelway Management Strategies

|                    |   |
|--------------------|---|
| <b>Encourage:</b>  | Non-motorized traffic - bicycles, hikers        |
| <b>Accept:</b>     | N/A   |
| <b>Discourage:</b> | N/A   |
| <b>Prohibit:</b>   | Public traffic during commercial use            |
| <b>Eliminate:</b>  | Unauthorized motorized vehicles when in storage |

***RESOURCE CONSIDERATIONS AND MITIGATIONS***  
**ROAD: 44995**

**Watershed/Fisheries:**

No concerns.

**Rock Borrow Sites:**

At approximately milepost 0.4 (the ridge top), rock exists that may require blasting. This rock is not good enough to be used as a source.

**Erosion Control:**

This road has steep grades and switchbacks.



# Log Transfer Facility Card

## Crystal Creek Log Transfer Facility

Acres: 5 (approx.)

Alternatives: 2,3,5,6

1977 Aerial Photo: Flight #: 50

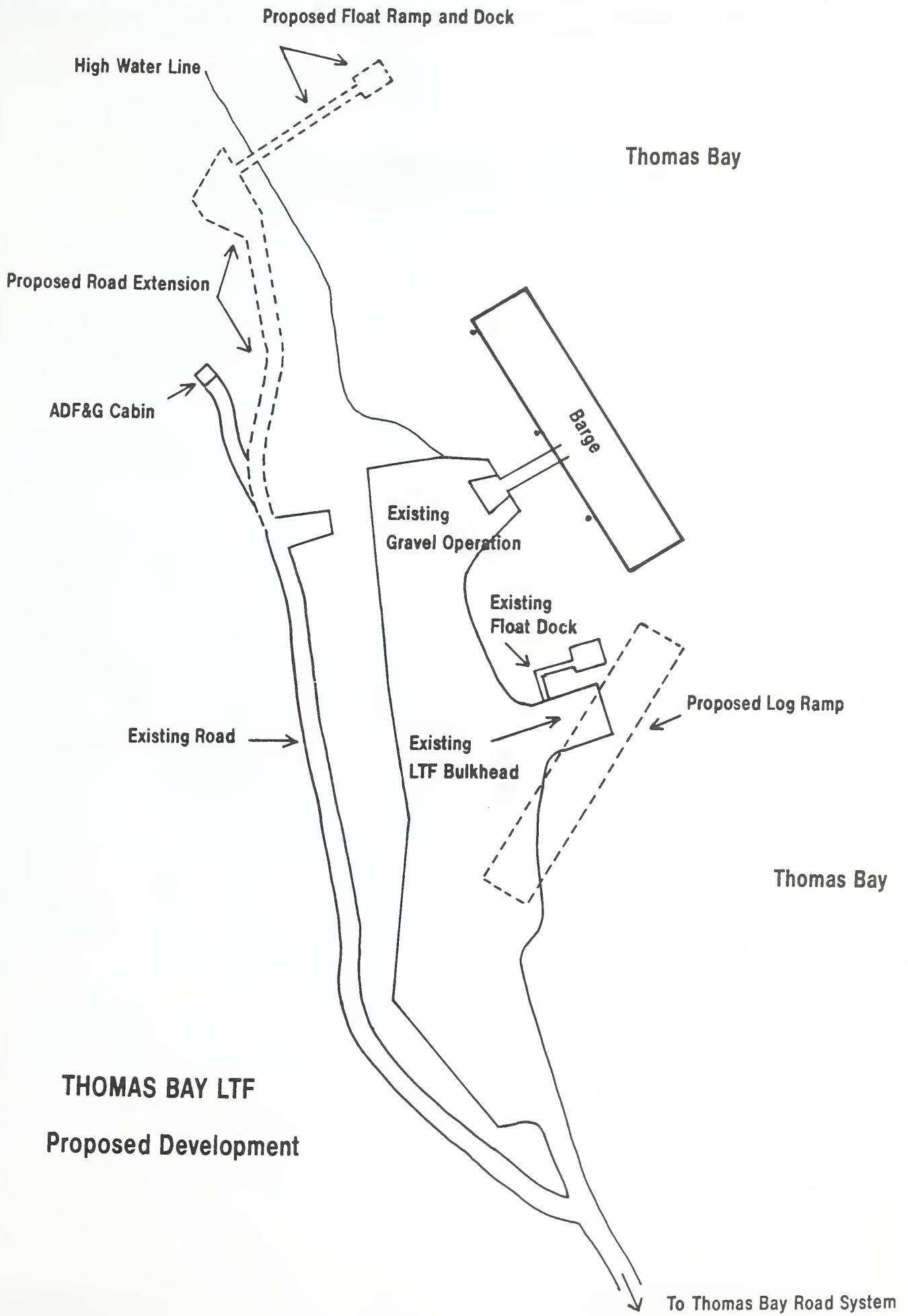
Photos # 1676, 9 and 10

### Resource Concerns and Mitigation

#### Marine Environment

Concern: Potential environmental impacts do to bark accumulation that may result in a direct or cumulative impact to the marine environment, especially shellfish.

Mitigation: Continued monitoring of bark accumulations which should not exceed one acre with accumulations of less than 10 cm. Any corrective measures would be determined in consultation with appropriate regulatory agencies.





# Recreation Card



## **Proposed Shelter with Access Trail Alternatives 2, 5, 6**

The proposed project would include the construction of a shelter on the shore of Ess Lake, construction of an access trail from Forest Development Road 6101 to the shelter, and the placement of a rowboat at or near the shelter site.

The site is on the northeast side of the lake and is suited for a shelter. The area is well-drained and would get plenty of summer sun. A three-sided shelter would fit into the surroundings and be compatible with the Roaded Modified Recreation Opportunity Class. The Regional standard design for a three-sided shelter would be used.

The proposed material for trail construction is gravel. A base layer of log corduroy may be needed in a few very poorly drained areas.

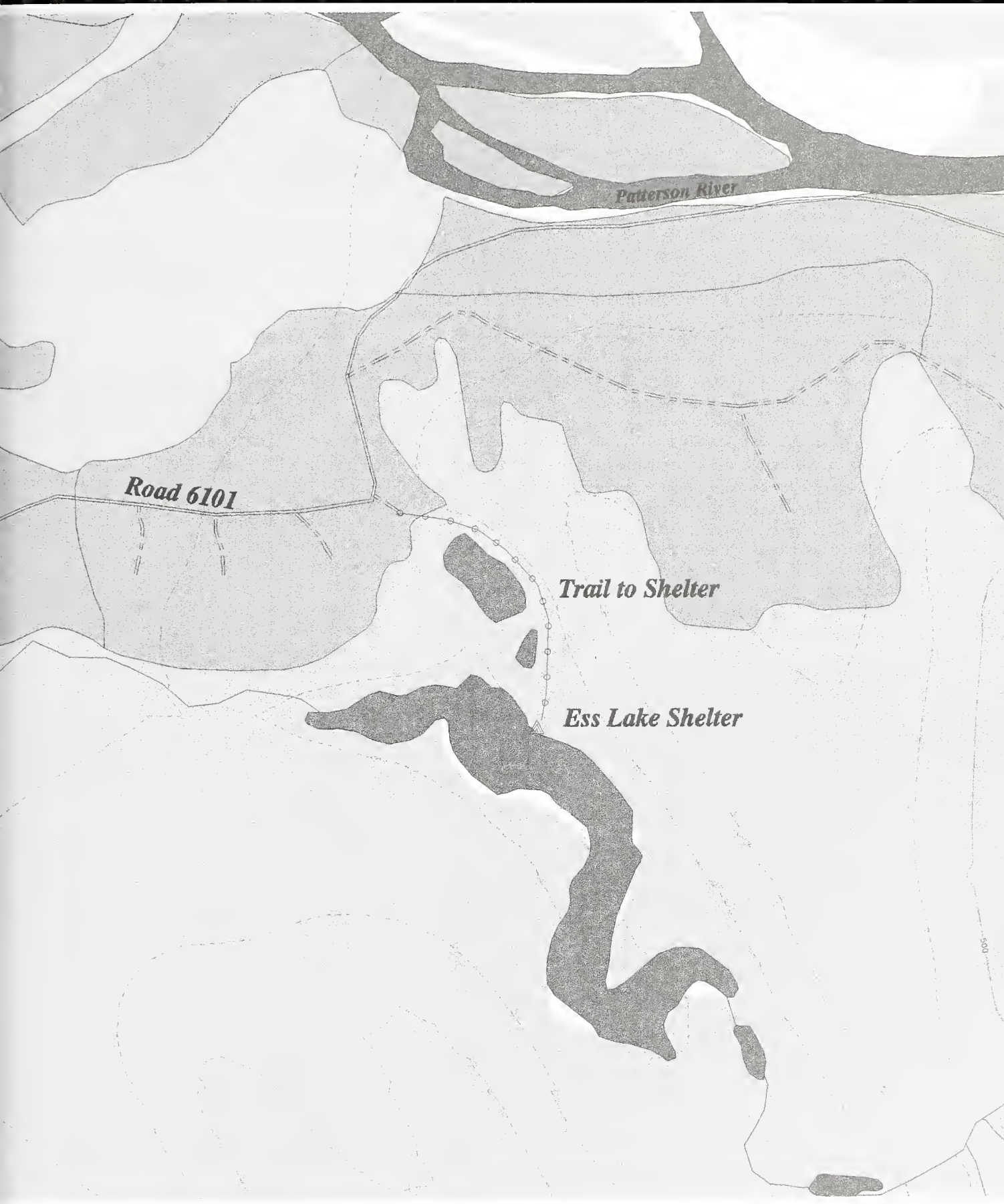
### **Resource Concerns**

**Scenery** - None of the proposed harvest units should be visible from the shelter. Unit 14 is on the opposite side of the ridge. The Ess Lake Shelter and immediate surroundings are not intended to be identified as a Visual Priority Route or Use Area. Scenery viewed from this location would continue to be managed according to the guidelines outlined in the Forest Plan Scenic Viewshed Land Use Designation.

**TES species** - The proposed site has been surveyed for Threatened, Endangered, and Sensitive (TES) plant and animal species and will be re-surveyed before implementation.

**Cultural Resources** - A cultural resources survey was completed and no cultural sites were identified.

**Fisheries** - There were no fisheries concerns with this proposal. Increased access to the lake would provide a recreational fishing opportunity for a cutthroat trout.



- |  |                      |  |                          |
|--|----------------------|--|--------------------------|
|  | Forested             |  | Closed Non-System Roads  |
|  | Managed Stands       |  | Non-NF Roads             |
|  | Freshwater           |  | Contour Interval: 100 ft |
|  | Non-NF Lands         |  | Trail                    |
|  | Streams              |  | Ess Lake Shelter         |
|  | Highways             |  |                          |
|  | All Vehicle Roads    |  |                          |
|  | High Clearance Roads |  |                          |
|  | Closed Roads         |  |                          |

0 715 14  
Scale is 1 inch = 715 feet

# Ess Lake Shelter



# Wetland Cards



## **Wetland Enhancement Card**

Alternative (s): 2, 3, and 6

A wetland north of the existing route of Forest Road 6256 at milepost 7.6 has the potential of being eroded by the Muddy River. The riverbed is lower than the wetland water level and further erosion could result in the wetland being drained. This section of the river bank would be stabilized by constructing approximately 600 feet of log and root-wad stream bank revetment. In addition, alder will be planted on a gravel bar located upstream to encourage soil deposition along the revetment.

## **Resource Concerns and Mitigation**

### **Wildlife**

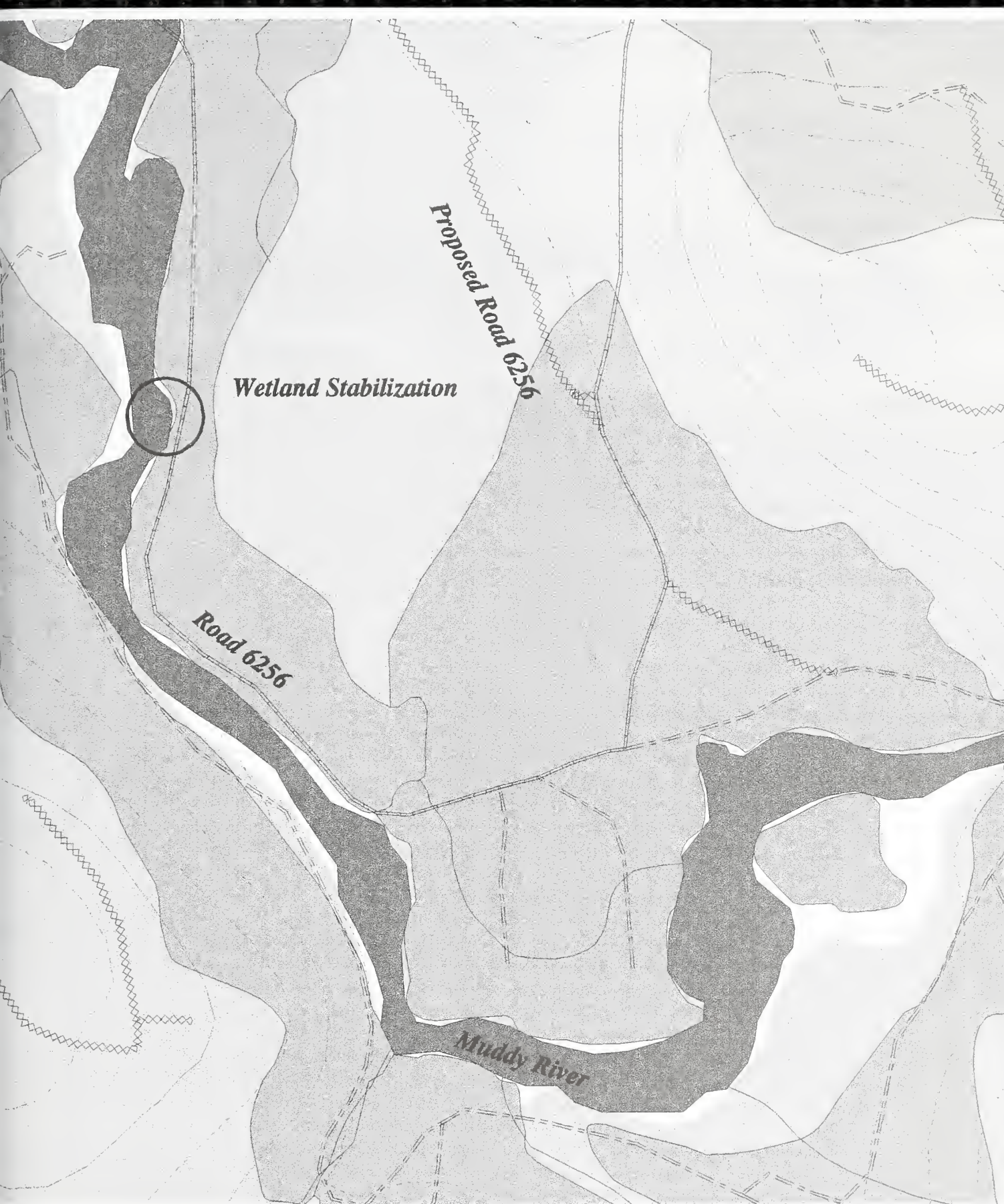
Concern: Swans have been observed in this wetland during fall months and may over-winter during mild winters.

Mitigation: This project will not be constructed between October 15 and April 15, if swans are present.

### **Transportation**

Concern: Equipment access needed to install the bank stabilization materials along the Muddy River will necessitate opening approximately 1/8 mile of a presently closed section of Forest Road 6256 and constructing approximately 200 feet of new temporary road around a portion of the road which has been eroded by the Muddy River.

Mitigation: This temporary road reconstruction will be conducted at the absolute minimum width for truck and equipment access. This road will be closed following construction. Organic debris will be spread over portions of this road to accelerate the regrowth of vegetation.



- Forested
- Managed Stands
- Freshwater
- Non-NF Lands
- Streams
- Highways
- All Vehicle Roads
- High Clearance Roads
- Closed Roads

- Closed Non-System Roads
- Non-NF Roads
- Contour Interval: 100 ft

0 639 1278  
 Scale is 1 inch = 639 feet

# Wetland Enhancement

## **Wetland Enhancement Card**

Alternative (s): 2 ,3, and 6

A wetland north of Forest Road 6256 has been identified for enhancement. This wetland has had a higher water level in the recent past as a result of a beaver dam which had raised the water level by approximately 14 inches above the current level. The higher water level will be reestablished by installing a new culvert at milepost 3.1 of Road 6256 at the appropriate height. Log or rip-rap structures will be constructed at the culvert outlet to ensure fish passage.

### **Resource Concerns and Mitigation**

#### **Wildlife**

Concern: Swans have been observed in this wetland during fall months and may overwinter during mild winters.

Mitigation: This project will not be constructed between October 15 and April 15 if swans are present.

#### **Fisheries**

Concern: The wetland provides prime rearing habitat for coho salmon.

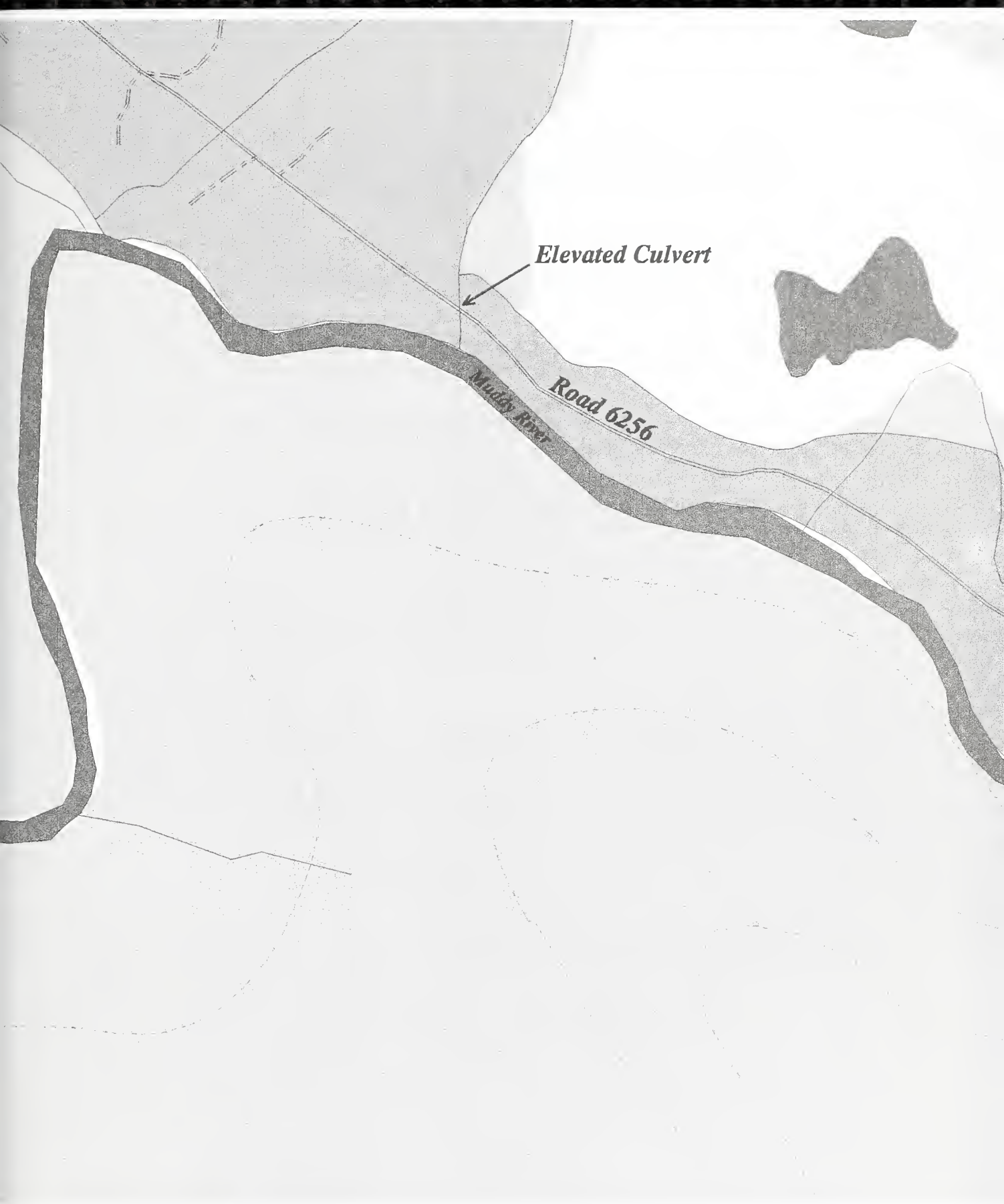
Mitigation: Fish passage will be designed as part of the project.

#### **Transportation**

Concern: The reestablished water level will be near the same elevation as the road surface.

Mitigation: The road bed will be raised in the vicinity of the new culvert to avoid any flooding problems over the road surface.





- Forested
- Managed Stands
- Freshwater
- Non-NF Lands
- Streams
- Highways
- All Vehicle Roads
- High Clearance Roads
- Closed Roads

- Closed Non-System Roads
- Non-NF Roads
- Contour Interval: 100 ft

0 638 1276  
 Scale is 1 inch = 638 feet

# Wetland Enhancement





# **Appendix B**

## **Response to Draft Environmental Impact Statement Comments**

# Crystal Creek Timber Harvest Draft Environmental Impact Respondents

| <u>Name</u>   | <u>Affiliation</u>                                   | <u>Page</u> |
|---|--|-------------|
| 1 Ralph W. Thompson                                       | U. S. Army Corps of Engineers                        | B-1         |
| 2 Lana Shea Flanders                                      | Alaska Department of Fish and Game                   | B-9         |
| 3 Peggy Wilcox for Marc Wheeler                           | Southeast Alaska Conservation Council                | B-15        |
| 4 Regional Environmental Officer -<br>Alaska              | U. S. Fish and Wildlife Service                      | B-27        |
| 5 Eric Lee  |  | B-37        |
| 6 Richard B. Parkin                                       | U. S. Environmental Protection Agency                | B-41        |
| 7 Jennifer R. Garland                                     | Alaska Division of Governmental<br>Coordination      | B-45        |
| 8 Lana Shea Flanders                                      | Alaska Department of Fish and Game                   | B-49        |
| 9 Kevin J. Hanley   | Alaska Department of Environmental<br>Conservation   | B-52        |
| 10 Sunny Rice, James Demko, Eric Lee,<br>Erik Lie-Nielsen | Narrows Conservation Coalition                       | B-55        |
| 11 Charles W. Challstrom                                  | National Oceanic and Atmospheric<br>Administration   | B-72        |
| 12 Andy Stahl   | Forest Service Employees for Environmental<br>Ethics | B-74        |
| 13 Ingvald Ask  |  | B-79        |



REPLY TO  
ATTENTION OF:

DEPARTMENT OF THE ARMY  
U.S. ARMY ENGINEER DISTRICT, ALASKA  
JUNEAU REGULATORY FIELD OFFICE  
JORDAN CREEK CENTER  
8800 GLACIER HWY, SUITE 106B  
JUNEAU, ALASKA 99801-8079

December 4, 1997

Regulatory Branch  
East Section

1-1-1997

DEC 8 1997

Tongass N.F.

Mr. Bruce Sims  
U.S. Forest Service, Stikine Area  
Tongass National Forest  
Post Office Box 309  
Petersburg, Alaska 99833-0309

Dear Mr. Sims:

These comments are submitted in response to the October 1997, Draft Environmental Impact Statement (DEIS), for the Crystal Creek Timber Harvest, near Petersburg, Alaska.

1-1  
Corps Jurisdiction: Based on information provided in the DEIS, and the interagency field review conducted from May 12-14, 1997, we have determined that wetlands and waters which are under the Corps of Engineers' (Corps) regulatory jurisdiction occur within the project area. The Corps' regulatory authorities that relate to timber harvest operations are based on two laws. Section 10 of the Rivers and Harbors Act of 1899 (33 USC 403) prohibits the obstruction or alteration of navigable waters of the United States (U.S.), and Section 404 of the Clean Water Act (33 USC 1344) prohibits the discharge of dredged or fill material into waters of the U.S., including wetlands, without a Department of the Army (DA) permit.

1-2  
Wetlands: Wetlands are defined as areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands include "muskegs", forested swamps, marshes, bogs, and similar areas. The DEIS states that approximately 38 percent of the Crystal Creek Project Area is classified as wetlands by the Stikine Area Soil Resource Inventory, which shows areas of hydric soils and wetland plants. Excluding the no action alternative, Table 3-47 reflects that between 4 to 40 acres of wetlands would be impacted by road construction, depending on the alternative selected. These roads would provide access to between 1 and 225 acres of wetland timber, and



the DEIS clarifies that these figures reflect the entire unit size and not the harvested acres, which would be less due to partial harvest methods.

1-2 With regard to preliminary wetland mapping, any valid sources of information such as U.S. Fish and Wildlife Service National Wetland Inventory (NWI) maps, the Tongass National Forest soil resource inventory/plant association data, or the Classification and Delineation of Wetlands Using Soils and Vegetation Data, Tongass National Forest (DeMeo, 1989), may be used as sources to support one or more wetland criteria (e.g., soils, vegetation, or hydrology), but can not be used as the sole source for making a final wetland determination. We have evaluated the preliminary wetland mapping for this project by random sampling against NWI mapping and aerial photography. Generally, the preliminary mapping is acceptable, however we did observe that an approximate 5 acre "muskeg" wetland between the boundaries of proposed Timber Harvest Units 67 and 70 was not reflected in your preliminary wetland mapping. However, it appears that the wetland is reflected in the Unit Cards, and that the Unit boundaries were established to avoid harvesting in that area.

1-3 Clean Water Act 404(f) Exemption Best Management Practices: As has been discussed, the construction or maintenance of forest roads used for the sole purpose of silviculture activities is exempt from regulation under Section 404 of the Clean Water Act, provided the roads are constructed and maintained in accordance with Best Management Practices (BMPs) listed at 33 CFR 323.4(a)(6) to assure that flow and circulation patterns and chemical and biological characteristics of waters of the U.S. are not impaired, that the reach of the waters of the U.S. is not reduced, and that any adverse effect on the aquatic environment is otherwise minimized. A copy of the mandatory BMPs is enclosed with this letter, and your particular attention is directed to BMPs (i) through (x).

1-4 Stream Crossings: Table 3-39 reflects that between 3 and 16 stream crossings would be required, depending on the alternative selected. Summary page (ix) states that stream crossings of Class I and II streams would be constructed to allow fish passage, and that temporary bridges would be used instead of small culverts to reduce soil disturbance and to protect fish passage when the road is closed. Page 2-10 states that timing restrictions on in-stream road construction work would be implemented during critical periods to protect fishery resources. BMPs ii, iii, iv, and vii address requirements for meeting the Clean Water Act 404(f) exemption for silvicultural roads regarding work in the vicinity of streams. We strongly encourage the use of temporary bridges to the maximum extent practicable, in order to minimize potential impacts to streams or other water bodies.

1-5 Wetland Avoidance: We have reviewed the proposed specified and temporary roads in terms of the above 404(f) exemptions, which require, in part, that discharges into wetlands shall be avoided if practical alternatives exist (BMP (x)). Based on our review of the DEIS Unit Cards, it appears that the section of proposed specified Road 44908 which accesses the southern end of Proposed Timber Harvest Units 14 and 17 could be shifted approximately 100' south to avoid a mapped muskeg/forested wetland mosaic reflected in alternatives 2, 3 and 5. Also, proposed specified Road 44920 impacts approximately 1 mile of a mapped forested wetland in proposed Timber Harvest Unit 81 under alternatives 2, 3 and 4. It appears that this road could be shifted approximately 100' west to avoid most of this wetland area. We are willing to review any supplemental information you may wish to provide concerning engineering or logistical constraints which would preclude the above alignment revisions. However, we have determined that based on the available information, the proposed roads in these areas would not meet the 404(f) exemption unless the above alignment revisions are made, and accordingly, DA authorization would be required. In this regard, your DA permit application for this work should include wetland delineation mapping and supporting field data sheets prepared in accordance with the 1987 Corps of Engineers Wetland Delineation Manual.

1-6 Road Closure: Road closures, connectivity to community road or ferry systems, and projects sited in isolated or low population areas are some indicators used to evaluate whether roads are being constructed for the sole purpose of silvicultural activities. The DEIS states on page 3-46 that under all alternatives, the Interdisciplinary Team is proposing to close all new road construction after timber harvest and to prohibit motorized access into the Crystal Creek drainage by the general public during and after timber harvest. The only new road access that would be open to the public after timber harvest would be 2.7 miles of reconstructed roads in Alternatives 2, 4, and 5, and 4.3 miles of reconstructed roads in Alternative 3. With regard to proposed road closures, the DEIS states on Summary page ix that after use, temporary roads would be closed, water bars added at appropriate places, and drainage structures removed. It also states on page 3-69 that a posted motorized closure to public access would be established at the potential bridge crossing of the Muddy River into Crystal Creek in Alternatives 2, 3 and 4. Posting a road closure notice would not be sufficient to preclude motorized public access, and effective physical barriers to motorized public access, such as gates, tank traps, removal of drainage structures, etc. are required. In addition, monitoring and maintenance is also required to ensure that closure methods are effective.

1-7 Log Transfer Facility: Appendix C of the DEIS indicates that four alternatives addressing the reconstruction of the Thomas Bay log

1-7 transfer facility are being evaluated. Corps authorization is required under all of the Alternatives shown for the discharge of dredged or fill material below the high tide line (extreme high water) or in wetlands, and for the construction of structures in navigable waters. In this regard, your DA permit application would need to include appropriate plans depicting all work requiring DA authorization, and specify the quantities and types of fill material proposed to be discharged below the high tide line and the quantities and types of material proposed to be excavated, in areas subject to Corps' jurisdiction. Your plans should also reflect any other work proposed in waters of the U.S., including wetlands, such as floating walkways, logging camps, outfalls, intakes, captive barges, log rafting areas, sort yards, etc.

1-8 In response to scoping concerns to hauling log rafts through crabbing areas, the DEIS states on page 1-15 that "the decision of whether to use barges or rafts to transport logs will be made by the U.S. Army Corps of Engineers, thus this decision is out of the scope of this document". For clarification, the Corps will make a determination as to the least environmentally damaging practicable alternative for the reconstruction of the Thomas Bay log transfer facility (i.e., facility design and configuration), based on our public interest review and compliance determination under the Clean Water Act Section 404(b)(1) guidelines, and not necessarily the use of barges or rafts for log transport. Potential impacts to navigation and commercial and recreational fishing would be evaluated as part of our public interest review. Authorization from the Environmental Protection Agency would also be required for the transfer of logs into marine waters.

1-9a Ess Lake Recreation Area: The DEIS states on page 3-79 that an area on the northeast end of Ess Lake is being proposed for the construction of a shelter/picnic area, and that an approximate 0.25 mile long access trail would be constructed from the existing road system. The trail would be gravel or boardwalk surfacing to minimize muskeg damage. Based on observations during the joint agency field trip, most of the proposed trail area is wetlands, and in this regard, DA authorization would be required for the discharge of fill material associated with this project. Your DA permit application for this work should include wetland delineation mapping and supporting field data sheets prepared in accordance with the 1987 Corps of Engineers Wetland Delineation Manual.

1-9b Muddy River Log and Rootwad Structure: The DEIS states on page 3-97 that a log and rootwad structure would be constructed along a 400 foot stretch of the Muddy River where a meander has eroded through the existing road. As was discussed during our field trip, this activity would require DA authorization, however, it may fall



1-9b under the limits of DA Nationwide Permit 13, which authorizes bank stabilization activities. Please provide typical plan and section drawings describing this work, including a location map and an estimate of the quantities of backfill material proposed (if any). Upon receipt of this information, we will provide a definitive jurisdictional determination for this project component.

1-10 During our conversation on November 6, 1997, you advised me that the proposed road reconstruction near the Muddy River erosion area has been shifted away from the river to avoid a long-term maintenance problems, and that some wetland impact would result. Please provide details of this proposed realignment, including a description of the project purpose, dimensions, and a discussion of the proposed realignment in relation to wetland mapping and the 404(f) BMPs. Upon receipt, we will provide a definitive determination concerning DA permit requirements for this work.

1-11 DA permit evaluation: Impacts to waters of the U.S. should be a major consideration during your review of alternatives with regard to both meeting the Federal BMPs, and for those project components which would require individual Section 10 of the Rivers and Harbors Act of 1899 or Section 404 of the Clean Water Act authorization. For wetland development proposals requiring Corps authorization, Corps permits are available only for projects which clearly demonstrate compliance with the Clean Water Act Section 404(b)(1) guidelines, which state that no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, as long as the alternative does not have other significant adverse environmental consequences. In those cases where a non water-dependent activity associated with a discharge is proposed for a "special aquatic site", such as wetlands, practicable alternatives are presumed to exist unless clearly demonstrated otherwise. An alternative is considered practicable if it is available and capable of being accomplished after taking into consideration costs, existing technology and logistics in light of overall project purpose.

Enclosed is a copy of our Regulatory Program Applicant Information pamphlet, which includes a permit application. This pamphlet is designed to assist you in applying for a DA permit and provides general information and guidance on how to complete the permit application.

We sincerely appreciate your invitation to take part in the May, 1997, interagency field trip to Thomas Bay, which was invaluable in terms of our review of this proposal. It is apparent after reviewing the DEIS that the Interdisciplinary Team has made a diligent effort to address our concerns with regard to potential impacts to aquatic



resources from road construction, and look forward to continued cooperation for this and future timber sales. We are available for further discussion or clarification of our comments, as necessary, and encourage you to contact me at the letterhead address, by telephone at (907) 790-4490, or by FAX at (907) 790-4499 if you have any questions concerning our requirements.

Sincerely,

A handwritten signature in cursive script that reads "R. Thompson".

Ralph W. Thompson  
Field Office Manager

Enclosures

Section 404 of the Clean Water Act Exemptions  
Best Management Practices for Forest Road Construction

33 CFR 323.4(a)(6), identifies Best Management Practices (BMPs) which must be met in order to claim an exemption from Section 404 permitting requirements for forest roads which are constructed for the sole purpose of silvicultural activities.

- i. Permanent roads, temporary access roads, and skid trails in waters of the US shall be held to the minimum feasible number, width, and total length consistent with the purpose of specific farming, silvicultural, or mining operations, and local topographic and climatic conditions.
- ii. All roads, temporary or permanent, shall be located sufficiently far from stream or other water bodies (except for portions of such road which must cross water bodies) to minimize discharges of dredged or fill material into waters of the U.S.
- iii. Road fill shall be bridged, culverted, or otherwise designed to prevent the restriction of expected flood flows.
- iv. Road fill shall be properly stabilized and maintained during and following construction to prevent erosion.
- v. Road fill shall be made in a manner that minimizes encroachment of heavy equipment within waters of the U.S., (including adjacent wetlands) that lie outside the lateral boundaries of the fill itself.
- vi. Vegetative disturbance in waters of the U.S. shall be kept to a minimum.
- vii. Road crossing shall not disrupt the migration or other movement of those species of aquatic life inhabiting the water body.
- viii. Borrow material shall be taken from upland sources whenever feasible.
- ix. The discharge shall not take, or jeopardize the continued existence of a threatened or endangered species as defined under the WSA, or adversely modify or destroy the critical habitat of such species.
- x. Discharges into breeding and nesting areas for migratory waterfowl, spawning areas, and wetlands shall be avoided if practicable alternatives exist.
- xi. The road fill shall not be located in the proximity of a public water supply intake.
- xii. The discharge shall not occur in areas of concentrated shellfish production.
- xiii. The discharge shall not occur in a component of the National Wild and Scenic River System.
- xiv. The road fill shall consist of suitable material free from toxic materials in toxic amounts.
- xv. All temporary fills shall be removed in their entirety and the area restored to its original elevation.

### **Forest Service Responses to the U.S. Corps of Engineers**

- 1-1: We will obtain all necessary permits.
- 1-2: We agree there is a mapping discrepancy. The unit card maps for Units 67 and 70 avoiding the muskeg are correct. The location has been field reviewed by the Area Hydrologist.
- 1-3: All BMPs will be followed as part of Forest Plan direction.
- 1-4: The Forest Service proposes to use temporary bridges at several locations. The Alaska Division of Governmental Coordination was highly supportive of this proposal (see 7-2). Refer to the Planned Road Descriptions in Appendix A. See response 7-2.
- 1-5: We have avoided wetlands wherever possible with our preliminary road route. Final surveys will not be completed until after the Record of Decision is signed. During the final survey, we will avoid these wetlands, if feasible, as required by law, policy, and Executive Order.
- 1-6: The Crystal Creek road will also be physically blocked by a gate at the Muddy River Bridge, water bars, and culvert/bridge removal. Posting a motorized vehicle road closure gives Forest Service law enforcement personnel the authority to issue citations to violators. Monitoring and maintenance of the road closure would occur as part of our regular Area-wide program.
- 1-7: We will continue to work closely with the Corps of Engineers to ensure appropriate permits are acquired.
- 1-8: The wording in the Final EIS has been corrected. All appropriate determinations, authorizations, and permits will be obtained before reconstruction of the log transfer facility.
- 1-9a: Before any construction begins on the proposed trail or shelter, the necessary permits and authorizations would be obtained.
- 1-9b: We will continue to work collaboratively to obtain all necessary authorizations and permits.
- 1-10: All action alternatives include the proposed realignment of the Muddy River Road (Road 6256). This map has been forwarded to the U.S. Army Corps of Engineers. The proposed alignment will cross a low-gradient stream and continue along the bottom of the slope located north of Muddy River. It will connect back into the existing Road 6256.
- 1-11: All action alternatives will be in compliance with the Clean Water Act. We will continue to work with the Alaska Department of Environmental Conservation and the Environmental Protection Agency.

# STATE OF ALASKA

## DEPARTMENT OF FISH AND GAME

### SOUTHEAST REGIONAL OFFICE HABITAT AND RESTORATION DIVISION

TONY KNOWLES, GOVERNOR

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17 December 1997

Bruce Sims, IDT Leader  
Crystal Creek EIS  
US Forest Service  
Stikine Area  
PO Box 309  
Petersburg, Alaska 99833

Dear Mr. Sims:

This letter includes Alaska Department of Fish and Game comments on the Crystal Creek Timber Sale Draft Environmental Impact Statement. The comments relate specifically to a Tongass Land Management Plan (TLMP) implementation issue: reviewing the design and location of small Old Growth Reserves in the project area. Additional comments on NEPA issues will be submitted through the Division of Governmental Coordination.

DEIS Alternative 3 shows the best options for configuring the small HCAs of any of the DEIS alternatives.

2-1  
Reconfiguration of the Pt. Agassiz small Old Growth Reserve (OGR) provides the best opportunity we have encountered so far in the multi-agency review of the TLMP Old Growth Reserve system to help protect biodiversity by including some of the last remaining rare high volume stands and plant associations in an Old Growth Reserve. The forest plan in Appendix K "Old Growth Habitat Criteria", Rules Applicable to all Reserves, specifically lists (D)(5) "rare features such as...stands with some of the Forest's highest volume timber stands" as one of the major considerations for placing reserves.

For that reason we strongly support an alteration to the Point Agassiz small OGR that would include a sizeable portion of the remaining high volume, low elevation forest south and east of the current boundary. The depiction of this small OGR in Alternative



3 in the DEIS more closely matches our preference for this reserve than the options in the other alternatives.

2-1 Justification for the current location of the Point Agassiz small OGR is weak. The current OGR encompasses predominantly low volume forest and large areas of muskeg and nonforest. The forest within the OGR is highly fragmented. The OGR is linear rather than circular. The high volume forest we are asking be included in the OGR is also fragmented but when it is a choice between types of fragmented forests in a conservation strategy, it is clearly preferable to retain high volume over low volume. The changes we recommend would also better concentrate forested areas and make the OGR less elongated and more circular.

2-2 The Forest Service's long range planning for the remaining high volume forest in this area through the life of the project is thinning and selected harvest. Leaving aside the fact that the DEIS provides no guarantee that future entries will not revert to the wholesale clearcutting practiced in the past, the Forest Service's justification for continued logging of high volume in this highly fragmented area is based on a habitat strategy for a single species, moose. Although we agree moose is an important wildlife species in the project area, there are ample opportunities to manipulate habitat for moose without further altering and effectively eliminating the remaining block of high volume, low elevation forest in the project area which is of value to other species.

2-3 The DEIS discussion of old growth reserves seems designed to put the US Fish and Wildlife Service (USFWS) and ADF&G alternative in the worst possible light. The DEIS wrongly claims that the USFWS/ADF&G alternative does not meet the forest plan criteria for old growth habitat reserves (pg.3-34). Boundaries of the reserve can be manipulated to affect the percentage of old growth within them. For instance many of the existing managed stands could be excluded from the reserve. Both the ADF&G and the USFWS have suggested that the Forest Service delete nonforest areas from the OGR. We have also indicated our willingness to delete at least some of the already cut (managed) stands from the proposed reserve.

2-4 The DEIS acknowledges that 57% of volume class 6 and 7 stands in the Thomas Bay area have already been logged. In contrast, only 28% of all productive old growth has been logged. Clearly the high volume has been cut in great disproportion to its occurrence in the area. All Forest Service alternatives for the Point Agassiz OGR would eventually result in liquidation of the remaining volume class 7 in the project area and leave all but a few acres of the flat, low elevation volume class 6 available and likely to be cut in this project and in the future.

2-5

The Forest Service justifies further logging in the high volume, low elevation forest of the West Muddy moose habitat area based on an internal moose habitat model not peer reviewed by ADF&G. That model makes the assumption that the optimum ratio of high forage production habitat to winter range is 50:50. Although that may be a reasonable assumption, the ratio is not based on empirical data. In addition, tables 3-15 and 3-16 of the DEIS indicate that, based on the model, there is no short or long-term benefit to moose from continued logging of this block of high volume forest. To call for more logging in a rare and over-exploited forest type based on a speculative hypothesis about habitat needs of a single species is indefensible.

2-6

In discussions about the small OGR with the ADF&G, the Forest Service has argued that the remaining high volume stands in the flat roaded area are needed to provide profitable timber sales to small operators for the next 20 years until second growth stands become available for commercial harvest. We cannot support the liquidation of the remnants of this rare low elevation highest volume forest for such short-term benefit. The ADF&G in numerous timber sale comments has warned that, aside from the detrimental effects to biodiversity and important wildlife habitat, disproportionate harvest of high volume old growth early in the rotation, like that which has occurred at Thomas Bay, makes it extremely difficult for the Forest Service to hold economic timber sales later in the rotation. Unfortunately, the new forest plan seems to sanction disproportionate harvest of old growth by scheduling the highest volume stands early in the rotation. Continued logging in these rare stands harms wildlife habitat values, diminishes diversity and jeopardizes the economics of future timber sales.

2-7

The ADF&G also supports the changes to the Brown Cove small OGR recommended by the USFWS. The upper portion of the Crystal Creek watershed is winter range for the Horn Cliffs goat population. Without protection of the OGR, logging could and likely would extend nearly to timberline in that drainage. Although this project proposes only group selection cuts for that portion of the drainage, future entries are likely to take more and there is no way to guarantee retention of any of that goat winter range without OGR designation.

2-8

In discussions about the USFWS and ADF&G proposals to reconfigure the small OGRs, the Forest Service has argued that not all the changes could be implemented because they might constitute "a significant plan amendment." Our understanding of the TLMP review of small OGRs is that individual project adjustments of reserve boundaries do not constitute a significant amendment, but that **Forest-wide** adjustments will be monitored yearly to determine

2-8

"whether a significant plan amendment is warranted on the basis of **cumulative changes**." (TLMP page 3-82, Old-growth Habitat Management Prescription, emphasis added).

2-9

Finally, although we are pleased with the amount of involvement we have had in the review of the small OGRs for this project area, we believe a more formal review process forest-wide is needed wherein technical staff from the Forest Service, USFWS, and ADF&G meet jointly to review composition, location, and design of the reserves, and wherein rationale and justification for current locations, proposed changes, and final decisions are formally and clearly documented.

Thanks for the opportunity to comment.

Sincerely,



Lana Shea Flanders  
Regional Supervisor

cc: Nevin Holmberg, USFWS  
Jennifer Garland, DGC

## Forest Service Responses to the Alaska Department of Fish and Game Comments

- 2-1: The small OGR designs in Alternative 3 are included in the Final EIS. Although the Point Agassiz OGR represented in Alternative 3 does contain high-volume timber stands, this design does not "Minimize to the extent feasible the amount of early seral habitat and roads within mapped reserves" as stated in Appendix K. We appreciate the efforts that U.S. Fish and Wildlife Service and Alaska Department of Fish and Game expended in helping to modify small Old-growth Reserves to meet a diversity of resource concerns. After receiving the comments on the Draft EIS, the Crystal Creek Team met with the U.S. Fish and Wildlife Service on 1/9/98 and developed OGR designs which were incorporated into Alternative 6. The design modifies the Forest Plan Point Agassiz OGR to include more high volume old growth and avoids early seral habitat (existing clearcuts).

All the designs for the Point Agassiz OGR are consistent with Forest Plan direction. The Assistant Forest Supervisor will decide which one to implement as part of the Record of Decision.

- 2-2: Silvicultural systems in the future may include clearcutting as a harvest technique but the units will likely be smaller and not as common as in the past. Given the advances in scientific knowledge and technological capability plus the trends in the rest of the country, it is more likely that alternative silvicultural treatments will be used. Future timber harvest will require NEPA evaluation and disclosure.

The decision to keep high-volume forest within the timber base was established in the Forest Plan without specific consideration to the local habitat needs of moose. Most clearcuts with reserves in the Crystal Creek Timber Harvest were planned for low productivity forests. Generally single-tree selection harvest designed to perpetuate the old-growth characteristics are recommended for the highest volume stands in the Point Agassiz area in the FEIS. We recognize that other wildlife species are also important and that some species are associated with old-growth habitat. Each alternative meets the needs of many species of wildlife to varying degrees as determined by analysis.

Please refer to responses 2-5 and 3-10.

- 2-3: In the DEIS (Table 3-18), the non-National Forest land was included in the calculations. More recent direction from our Regional Office recommended leaving non-National Forest land out of these calculations.

Because of concerns raised, we evaluated OGRs in the FEIS with respect to the amount of productive old growth included in each alternative. All proposed OGRs contain high-volume old-growth. The OGR designed for Alternative 6 in the FEIS has excluded managed stands and certain nonforested areas as your comments suggest. However, managed stands and non-forested areas were not deleted from the Point Agassiz OGR in Alternative 3.

- 2-4: Although the areas cut in the 1960's and 1970's have been mostly in the high volume old-growth, the Crystal Creek alternatives do not concentrate logging in the remaining high-volume stands. All alternatives which harvest within the low-elevation, high-volume stands near Point Agassiz use more single-tree selection than clearcutting. This would maintain these stands in an old-growth condition over time. We cannot predict how these stands will be managed in the future. See the response to 2-2.

- 2-5: Please refer to response 2-2 and 4-9b.

Two models were used to compare alternatives for the effects on moose habitat for this analysis. Moose at Thomas Bay represent a unique habitat adaptation by the species and require site-specific habitat information for the modeling process.

The quantitative model used was developed from the only available published habitat data collected within the study area. It follows the standard method of deriving habitat suitability index values used to develop the Forest-wide wildlife models, which were peer-reviewed.

The qualitative moose model used is based on the assumption that moose prefer a mosaic of habitat types. This is different from the other Forest-wide wildlife models where biologists identified only the preferred habitats as



important to the species. Although moose in the planning area appear to prefer clearcuts to old growth on a year-round basis, we believe that forested winter range is also an important habitat component during periods of deep snowfall. We recognize that some biologists and members of the public have reservations about this type of modeling, but believe that the qualitative model helps to assure that a variety of habitats utilized by moose are considered and provided for through time.

2-6: See response to 2-1.

The IDT tried to protect the high-volume old growth in the Point Agassiz area and maintain some opportunities for small timber sales and subsistence wood gathering activities. We have developed Alternative 6 for the FEIS to balance these concerns. Other action alternatives had varying amounts of protection and proposed harvest within this area.

The analysis indicates that Alternatives 2 and 6 actually harvest a higher percent of the low-volume strata stands within the project area than the high-volume strata stands. See FEIS Tables 3-2 and 3-3.

The Forest Plan (1997) did not schedule the highest volume stands early in the rotation. The Strata Harvest Control constraint (Forest Plan EIS, B-14) was built into the model used to determine the ASQ and harvest schedule (FORPLAN). Please see Forest Plan, Appendix B for a complete discussion of how timber harvest was scheduled and the constraints and model implementation reduction factors added.

2-7: Much of the goat winter range near Horn Cliffs is already within the Brown Cove small OGR (See Figure 3-29) or within the Stikine-LeConte Wilderness. The Brown Cove small OGR design in Alternative 3 included more of the goat habitat for the Horn Cliff population. This design is also incorporated in Alternative 6.

2-8: Our point (DEIS, 3-32) about the significant Plan amendment was that if doubling the size of an OGR established a precedent for future OGR modification then the cumulative effect may substantially alter land use allocations, not that it couldn't be implemented. The IDT can recommend changes that would constitute a "significant" plan amendment. Significant plan amendments would include decisions that would substantially alter the land use allocations. Minor changes to OGRs would not usually constitute "significant" plan amendments. The Assistant Forest Supervisor will determine if changes proposed in the Forest Plan are significant or non-significant. Please refer to the Forest Plan, p. 5-2 to 5-4.

2-9: We too are pleased with the interagency cooperation on this project. For a Forest-wide process the Record of Decision for the Tongass National Forest, Land and Resource Management Plan Revision clearly identifies the process for review of the old-growth habitat strategy and the small old-growth habitat reserves. It states that the Forest Service will design and interagency scientific review of the old-growth habitat strategy. It is anticipated that this Forest-wide review will be adequate. In addition, the Forest Plan has identified a monitoring question that will address your concern. The question is:

"Are contiguous blocks of old growth habitat being maintained in a forest-wide system of old growth reserves to support viable and well distributed populations of old growth associated species and subspecies?"

The Record of Decision also states that interagency reviews of the location of small old-growth habitat reserves will occur in relation to where new projects are being planned. Rationale for this approach includes the need for detailed site specific information at this scale that can only be acquired at the project level. It also includes the need for NEPA analysis and documentation for the Forest Plan amendments that are required to adjust reserve location. Public involvement is a result. Project level analysis is the appropriate level for interagency review of the location of small Old-growth Habitat reserves.



# Southeast Alaska Conservation Council

SEACC 419 6th Street, Suite 328, Juneau, AK 99801

(907) 586-6942 phone (907) 463-3333

info@seacc.org

December 19, 1997

Bruce Sims, IDT Team Leader  
USDA Forest Service, Stikine Area  
P.O. Box 309  
Petersburg, AK 99833

Re: Comments on Crystal Creek Timber Harvest DEIS

Dear Mr. Sims:

The following comments are submitted on behalf of the Southeast Alaska Conservation Council (SEACC) on the Crystal Creek Timber Harvest Draft Environmental Impact Statement (DEIS).

SEACC is a coalition of fifteen volunteer conservation groups in twelve communities across Southeast Alaska, from Yakutat to Ketchikan, including Narrows Conservation Council in Petersburg. SEACC's individual members include Alaska Natives, subsistence users, commercial and sport fishermen, hunters and guides, tourism and recreation business owners, small timber operators and high value-added wood product manufacturers, as well as concerned citizens from all walks of life. SEACC is dedicated to safeguarding the integrity of Southeast Alaska's unsurpassed natural environment while providing for balanced, sustainable use of our region's resources.

## Introduction

As of March 27, 1997 the last of Southeast Alaska's pulp mills has closed and the last long-term contract is terminated, per agreement. The Forest Service finally has the opportunity to create a transition away from the failed policies of the past towards a truly balanced, sustainable management of our largest, wettest, and wildest National Forest. With the current sea change underway on the Tongass, the Forest Service has the opportunity to provide for all of the uses of the forest while encouraging the development of a small-scale community-based high-value added wood products industry in Southeast Alaska. As the first DEIS released after the completion of the revised Tongass Plan, the Crystal Creek project offers an opportunity to begin this transition. SEACC also takes a keen interest in this sale as it reflects how the agency will be implementing the new Tongass Plan in the near term.

## 1. THE PURPOSE AND NEED STATEMENT VIOLATES NEPA.

Unfortunately, the Forest Service is still hog-tying its project planning efforts to arbitrary "timber targets" selected outside the public planning process. With passage of the Tongass Timber Reform Act in 1990, Congress meant to end this "timber first" management approach to Tongass management. As noted by Congressman George Miller, House Floor manager throughout Congressional debate and deliberation on over the Tongass Timber Reform Law:

Section 101 puts a halt to the Forest Service's "timber first" approach to managing the Tongass. The Forest Service's originally interpreted ANILCA section 705(a) as a mandate to offer 450 million board feet of timber annually, no matter what the market demand, impact on multiple uses, or cost to the taxpayers. As amended section 705(a) requires that timber sale offerings even if consistent with other resource needs and sustained yield principles, must not be in excess of actual market demand

136 Cong. Rec. H12833 (daily ed. Oct. 26, 1990)(emphasis added)

According to the DEIS, the Purpose and Need for this project is:

"[T]o implement the 1997 Tongass Land Management Plan (Forest Plan) by making available approximately 16 MMBF of net sawtimber plus utility volume, hereinafter referred to as timber volume, to the timber industry as part of the Stikine Area timber program. The need for this project is to contribute an orderly and sustained volume of wood fiber to meet local and national demand and provide local and regional employment opportunities."

DEIS at I-1. The Forest Service has therefore unnecessarily tied this project to an artificially constructed timber target. With such a timber target, the Forest Service cannot offer a reasonable range of alternatives for this project. The Purpose and Need is therefore in violation of NEPA and needs to be altered to reflect an honest effort towards balanced, multiple use management of the project area.

Furthermore, the statement that the purpose of the project "is to implement the 1997 Tongass Land Management Plan by making 16 mmbf of net sawtimber plus utility volume to the timber industry as part of the Stikine Area timber program" is meaningless, since according to the Forest Service, "the revised Forest Plan does not make site-specific decisions" Revised TLMP, FEIS, App. L at L-150. Therefore, TLMP does not provide a basis for allowing project planners to select timber targets for individual timber sale planning projects outside the public planning process. After all, TLMP didn't even include a 10-year schedule as required by NFMA. See 36 CFR § 219.10(e).



## II. THE FOREST SERVICE'S CONTINUED EFFORTS TO PROVIDE TIMBER FAR IN EXCESS OF LIKELY DEMAND VIOLATES THE TTRA AND NEPA.

In its discussion of market demand for Tongass timber, the Forest Service continues to misrepresent the findings of its own economists. The Forest Service erroneously states that "the median estimate of demand for the entire Tongass timber program for the next decade (1998-2007) is an average of 110 MMBF of sawtimber volume per year." DEIS at 3-14 (emphasis added)

Having commissioned a credible, in-house report, the ROD and Final EIS for the revised TLMP and now project level EIS all grossly mischaracterize and misapply that report in an apparent effort to justify a large-scale timber program, and the planning staff and budget that goes with it. See SEACC's appeal of the revised Tongass Plan (Appeal # 97-13-00-0101) at 104, attached.

### A. The Brooks and Haynes Report Calculated Demand For Total National Forest Logging, Including Both Sawlog And Utility Volume.

3-2 In September 1997, two respected Forest Service economists released a revised forecast of demand for timber from the Tongass National Forest. D. Brooks and R. Haynes, Timber Products Output and Timber Harvests in Alaska: Projections for 1997-2010 (September 1997). This revised forecast reflected the closure of both pulp mills in Southeast Alaska and international market conditions, such as increasing competition and reduced demand from Japan. Id. at i. The report calculated low (96 MMBF), medium (113 MMBF), and high (130 MMBF) scenarios for demand for Tongass wood products though the next five years which reflected different assumptions about future markets. Id. at Table 1.

For all scenarios, however, the report calculated total market demand: "[t]hese figures refer to total National Forest Harvest, including both net sawlog and utility volume." Id. at 3 (emphasis added). Brooks and Haynes' explicitly assumed that all utility logs will be exported. Id., an unnecessary step if their calculation was for sawlogs only.

Thus, the Forest Service needs to correct their flawed interpretation of its own economic studies and include a true representation of it in the FEIS for the Crystal Creek project.

### B. The Forest Service's Continued Efforts to Provide Timber in Excess of Market Demand Violates The Tongass Timber Reform Act.

The Tongass Timber Reform Act directs the Forest Service, subject to appropriations, NFMA, and all other applicable law and to the extent consistent with providing for the multiple use and sustained yield of all renewable forest resources, to



seek to provide a supply of timber from the Tongass National Forest which (1) meets the annual market demand for timber from such forest, and (2) meets the market demand from such forest for each planning cycle.

16 U.S.C. 539d(a).

The Forest Service need not supply any particular volume of timber under this provision. Alaska Wilderness Recreation & Tourism Association v. Morrison, 67 F.3d 723, 731 (9th Cir. 1995). To the extent the agency allows logging, the statutory direction is to seek to "meet" market demand, annually and for the planning cycle, not to exceed or try to create it.

3-2

According to the Indian River Timber Sale(s) DEIS, "[a]s of June 30, 1997, there is 504 mmbf of unharvested timber volume under contract to the timber industry." Indian River Timber Sale DEIS at 1-4. Obviously, the Forest Service has already supplied the timber industry with 5 times the estimated annual demand for Tongass timber. The Indian River DEIS goes on to say "[a]t this time, there is approximately 624 mmbf proposed under other ongoing NEPA analyses on the Tongass for the 1998-2002 time period." Thus, in a five-year period, the Forest Service plans to provide the timber industry with approximately 1125 mmbf of Tongass timber. Total expected median market demand for Tongass timber during this same time period is 565 mmbf. **Current timber sale planning across the Tongass, therefore, will provide Tongass timber in excess of market demand to the tune of over half a billion board feet in clear violation of the TTRA.**

### III. THE FOREST SERVICE NEEDS TO GIVE MORE WEIGHT TO PROVIDING OPPORTUNITIES FOR SMALL SALES AND LOG SORTYARDS.

3-3

We are encouraged to at least find a discussion of opportunities for offering small sales and providing opportunities for log sortyard sales. However, the Forest Service planning still seems biased towards large-scale timber sales which require extensive building of permanent roads. Simply stating that "[s]mall sale opportunities may increase after a larger sale is sold and more access road is provided" (DEIS at 3-17) fails to adequately respond to needs of small-scale independent operators, because the large-scale offerings which include large-scale road building have traditionally taken all the best timber. **This represents the old way of doing business on the Tongass and it must end.**

We suggest the Forest Service design at least one alternative which is completely devoted to offering small offering for timber operators. This alternative should also include at least one or more units to be logged under contract, barged to Petersburg, and offered for sale at auction at a log sortyard. Such a log sortyard sale would provide timber to wood products manufacturers who might not have the capital available to buy a timber sale, log it, and bring it to the mill. Such value-added manufacturers would in this way have more time to concentrate on the manufacture and

3-3

marketing of wood products. The Ketchikan Area has considered this innovative approach; why not try it on the Stikine Area?

#### IV. ALL ALTERNATIVES WHICH AUTHORIZE THE CONSTRUCTION OF NEW PERMANENT ROADS ARE ILLEGAL BECAUSE THE FOREST SERVICE LACKS A FOREST DEVELOPMENT ROAD SYSTEM PLAN FOR THE TONGASS.

All of the action alternatives in the DEIS require the construction of between 6.4 and 15.4 additional permanent roads in the project area. Such road building plans are illegal and inconsistent with national and regional management direction. See SEACC's appeal of revised Forest Plan at 78.

3-4

Therefore, in order to consider at least one alternative which meets all the requirements of law, the Forest Service should craft an alternative which doesn't build any new permanent roads. Even the alternative designed to respond to public comments requesting no new roads (Alternative 5) requires the construction of 6.4 additional miles of permanent roads. To truly respond to public comments and comply with all applicable laws, the Forest Service should amend Alternative 5 by converting all the proposed new permanent roads to temporary roads or deleting them altogether. If the agency finds that construction of permanent roads is necessary, then future development along the road system is reasonably foreseeable and must be addressed in this EIS. By concentrating on using the existing road system and not requiring any new permanent roads, this timber sale could go a long way to meet the needs of small independent timber operators.

3-5

#### V. THE SMALL OLD-GROWTH RESERVES AS DESIGNED BY THE REVISED FOREST PLAN AND MODIFIED BY THE CRYSTAL IDT ARE INADEQUATE TO MAINTAIN VIABLE AND WELL-DISTRIBUTED POPULATIONS OF OLD-GROWTH DEPENDENT SPECIES.

3-6a

Contrary to the implications of the DEIS's discussion on page 3-42, high volume timber stands are of unquestioned value to wildlife. See, e.g., U.S. House of Rep.s 1987, p.23 ("[t]he purpose of this subsection [in a direct precursor bill to TTRA] is to protect as much possible those high-volume stands (greater than 30,000 board feet per acre) which generally comprise the best wildlife and fish habitat areas on the Tongass"); Alaska Dept. of Fish and Game, 1990, p.3 ("[h]igh volume stands provide critical winter habitat for deer, as well as life history requirements for other species, such as mountain goats, furbearers, brown bears, cavity-dependent birds, and numerous plants and invertebrates"). Apart from their importance as habitat for many species, they also contribute significantly to overall forest diversity. See e.g., Kirchoff, 1989, p.1 ("[T]hese relatively rare forest types, including productive high-volume stands in riparian sites, are especially rich in biotic diversity and function as seasonable critical habitat for a number of important wildlife species").

Over the years, logging operations on the Tongass have focused very heavily on the higher, more lucrative, volume classes. Comparisons of annual cut volume with acres logged show that the average volume cut before TTRA was approximately 50,000 board feet per acre, the dividing line between VC 6 and VC 7. See, e.g., Alaska Department of Fish and Game, 1990, p.3 ("between 1980 and 1986, inclusive, the average volume per acre harvested from the Tongass exceeded 54,000 board feet"); Kirchoff, 1989a&b (same, in addition from 1956-72 over 50,000 board foot average, and from 1971-1981 over 48,000). A state wildlife biologist calculates, based on Forest Service data, that prior to 1978, 70% of all acres logged on the Tongass were VC 6 or 7 and 95% were VC 5-7. Kirchoff, 1989, Table 4. As a result, half of all VC 6 and 7 lands on the Forest were already converted to second growth by 1980. Id., p.1. Only 115,000 acres of the highest volume growth, VC 7, remained. Kirchoff, 1988a, p. 1.

3-6a In the wake of the extensive high-grading that has occurred on the Tongass, all remaining high-volume old-growth stands have even greater value for old-growth dependent wildlife. In the Crystal Creek project area, the DEIS admits that "[a] large percentage of these stands has already been harvested, approximately 3,717 acres on National Forest Land." DEIS at 3-7. Comparing this figure with the amount of VC 6 and 7 left in the project area (2,679 acres), one determines that over 58% of the high-volume old-growth has been logged in the project area. Given this fact, the Forest Service should make every effort to protect the large blocks of high-volume old-growth left in the project area.

The most effective way to protect these stands is by adjusting the boundaries of the small old-growth reserves as mapped in the revised TLMP FEIS and ROD. Appendix K of the revised Forest Plan gives the Forest Service direction to "add or modify old-growth reserves to meet criteria" outlined for old-growth reserves. Forest Plan at K-1. The Forest Service is supposed to place reserves "to help meet multiple biodiversity or wildlife habitat objectives" and should consider factors such as "[I]mportant deer winter range...[and] the largest remaining blocks of contiguous old-growth within a watershed." Id. Furthermore, the Forest Plan directs the Forest Service to "include consideration of landscape linkages between larger reserves" when designing small reserves. Id. at K-2. Therefore, the Forest Service should make every effort to adequately respond to the March 5 comments of the US Fish and Wildlife Service, in which the agency requested redrawing the boundaries of the small HCAs in order to protect more VC 6 and 7 in order to protect biodiversity and important mountain goat winter range while providing connectivity between reserves. While it is heartening to

3-6b find the USFWS's suggested HCAs in one of the alternatives, we find it ironic that the USFWS's suggested HCA boundaries are only contained in the alternative which prescribes the most logging. We suggest that the Forest Service alter all alternatives to include the changes recommended by the USFWS.

3-7 VI. THE DEIS'S FAILURE TO REQUIRE A WATERSHED ANALYSIS DOES NOT RESPOND ADEQUATELY TO THE RECOMMENDATIONS OF THE



## ANADROMOUS FISH HABITAT ASSESSMENT REPORT (AFHA) AND VIOLATES NEPA.

3-7 One of the most important recommendations of the AFHA report was that the Forest Service should perform a cumulative watershed effects analysis before project level planning begins. See SEACC's Appeal of the revised Tongass Plan at 118. While the DEIS admits that a disproportionate amount of logging has already impacted the riparian areas of the Patterson and Muddy Rivers, no Cumulative Watershed Effects Analysis (CWA) was done because of an artificially imposed criteria in TLMP that fails to implement the most basic recommendations of AFHA. Watershed Analysis should be done to provide adequate information to decide the amount of additional protective measures necessary to safeguard fishery values. Regardless of TLMP & AFHA, the Forest Service must conduct a complete CWA to comply with its obligations under NEPA.

The new TLMP requires watershed analysis only if a project decision proposes specific adjustments of the standards and guidelines for a process group (Forest Plan, Appendix J). This management direction, however, does not guarantee compliance with NEPA's requirement for a site-specific analysis to be sufficiently detailed to permit assessment of cumulative environmental effects of the proposed action. See 40 CFR § 1502.16.

## VII. THE FOREST SERVICE'S ANALYSIS OF IMPACTS ON SUBSISTENCE RESOURCES IS INADEQUATE.

3-8 The DEIS admits that the Horn Cliffs goat population is important to subsistence goat hunters in Petersburg. By constructing additional permanent roads in the Crystal Creek drainage, alternatives 2,3 and 4 will create additional access to this goat population and may cause overhunting of the population. The DEIS states that "the possibility that overharvest of goats will occur under Alternatives 2,3, and 4 cannot be entirely ruled out." DEIS at 3-68. Since the Forest Service fails to conclusively state that subsistence use of goats will not be restricted in the project area, the possibility does exist that subsistence goat hunting may be restricted under several of the alternatives. Therefore, the Forest Service must schedule an 810 hearing in Petersburg, pursuant to ANILCA.

3-9 The Forest Service's plan for road closures in the project area fails to assure the public that access will be restricted. Considering past Forest Service road management, one expects to find all permanent roads left open after timber sales are over. Once a road is built, it is nearly impossible to prevent the public from using the road for motorized access. In fact, the DEIS admits that there is significant public and agency pressure to maintain and improve road access in the Thomas Bay area to provide opportunities for moose hunting. DEIS at 3-19. In order to truly respond to concerns of overharvesting the Horn Cliffs goat population, one or more alternatives should limit road construction in the Crystal Creek drainage to temporary roads only or have no road building in the watershed whatsoever.



## VIII. THE FOREST SERVICE'S EFFORTS TO MANAGE THE AREA FOR MOOSE POPULATIONS ARE MISGUIDED AND VIOLATE TTRA.

3-10

While it is true that the Thomas Bay area is heavily used by area moose hunters, moose hunting is not the only use for the area. An alternative which focuses on moose management above other resources does not reflect a commitment to balanced, multiple use management of all renewable Tongass resources as mandated by the Tongass Timber Reform Act.

3-11

It seems that the Forest Service's interpretation of sound moose management involve clearcutting more old-growth along with intensive thinning of second-growth. The model used to evaluate moose habitat capability relies on extensive management of second-growth, even though the Forest Service lacks the budget to perform such extensive thinning operations. In real terms, unless second-growth treatment costs are calculated into the stumpage costs for timber sales in the area, the Forest Service is unable to guarantee the ability to perform the required costly thinning operations in the future. These expected thinning costs should also be factored into the demand analysis for this timber sale. Under the strategy outlined by the DEIS, the public can only realistically expect to get more clearcuts and more even-aged second-growth forests.

3-12

The Forest Service's only means of maintaining high moose numbers in Thomas Bay is through reliance on clearcutting. But, as the DEIS mentions, moose also depend on old-growth forests for cover during harsh winters. Thus, if the Forest Service wished to develop a financially realistic approach to maintaining high moose numbers, it would work hard to develop markets for second-growth timber (for house logs, construction lumber, etc.) and commit the present second-growth stands to intensive short-rotation clearcutting. In this way, the Forest Service would be able to intensively manage these stands to produce high moose populations, provide timber for local value-added operations, and have the ability to safeguard adequate habitat in the area for old-growth dependent wildlife species.

3-13

## IX. THE DEIS FAILS TO FULLY EVALUATE THE IMPACTS ASSOCIATED WITH LOG TRANSFER.

The Thomas Bay area is heavily used for recreation, hunting, and fishing by Petersburg residents. In order to cause the least adverse impact on these uses, the Forest Service must fully disclose and evaluate all impacts related to log transfer. Appendix C of the DEIS indicates that the Forest Service is considering several alternatives for reconstructing the existing LTF at Thomas Bay. Full consideration of these alternatives should be integrated into the evaluation of project alternatives in the DEIS. Reasonable alternatives to traditional in-water log transfer that must be considered include onshore storage with barging of logs and direct helicopter transfer of logs to barge. All potential impacts on the human environment from these various alternatives must be disclosed, including impacts due to bark debris and impacts due to filling tidelands. Shunting this analysis in an Appendix and failing to fully disclose and evaluate these impacts in the DEIS

3-13

discussion of alternatives violates NEPA because log transfer is an integral part of all project alternatives. We believe the Forest Service analysis must show that it is not feasible and prudent to adopt any of the several zero-discharge alternatives available before allowing in-water transfer of logs

The Forest Service indicates that several dive surveys have been performed in the area. DEIS at 3-90. In order to fully inform the public and decision makers about the impacts related to log transfer, the results of these dive surveys must be disclosed.

Sincerely,

*Peggy Wilcox for Marc Wheeler*  
Marc Wheeler  
Special Projects Coordinator

## Forest Service Responses to the Southeast Alaska Conservation Council

- 3-1a: At the time the Crystal Creek Timber Harvest project was initiated, we included the approximate timber volume anticipated to be harvested in the purpose and need statement. The interdisciplinary team developed alternatives which addressed the issues raised during the public scoping process and not an "arbitrary" timber volume. The range of alternatives does not necessarily mean a range in volume although, this project also displays a range in timber volume (11.8 to 16.4 MMBF). We feel that we have achieved a range with the geographic distribution of units, silvicultural methods, differing timber volumes, and how the alternatives respond to issues. The timber volumes are offered over multiple years.
- 3-1b: The Forest Plan included a timber sale schedule (Appendix L) which provides for the allowable sale quantity (36 CFR 219.16). As part of Forest Plan implementation, changes may be made to the sale schedule to deviate from the Forest Plan timber sale schedule (36 CFR 219.10e). Currently, the Stikine Area part of the timber sale program has been reduced from an average annual amount of 95 MMBF to 77 MMBF (Forest Plan page 5-1).

The Forest Plan (page 4-95) states specifically that NEPA is not needed for timber sale scheduling. Public participation was extensive during the Forest Plan revision process which determined the ASQ. The amount of timber harvest originally identified in the proposed action is determined from the amount of tentatively suitable forest in the area and other resource constraints. The amount is disclosed to the public during project scoping. We often get comments recommending more or less harvest than the proposed action.

- 3-2: The draft Brooks and Haynes report (June 1997) was used for the DEIS since it was the best information at the time of preparation. This information has been updated using the final Brooks and Haynes report (September 1997) and is included in the report "Reasons for Scheduling the Crystal Creek Timber Harvest Project" located in the planning record.
- 3-3: Much of the best timber in the Crystal Creek project area is already easily reached from existing roads and would be ideal for small sales whose purchasers may not be equipped to construct roads. For the last few projects on the Stikine Area, Bohemia, Shamrock, and South Lindenberg, we have left units that are already accessed by road or are adjacent to a proposed road for small sale opportunities. The actual size and scheduling of the sales depend in part on our agreement with the Small Business Administration and requests from operators.

The Forest Service does not enter into direct competition with the timber industry as we would be by auctioning off timber at a log sortyard. This is an option for any purchaser to pursue, if there was enough interest from the Petersburg value-added manufacturers. At least one operator has publicly expressed interest in doing this. Future small sales on Mitkof Island would provide the material for a logging operator to do this more economically without barging the material.

- 3-4: The Forest Service maintains a Forest Development Transportation Plan in accordance with direction found in Forest Service Manual 7711. This plan is the official description of the forest development transportation system and consists of a base map or series of base maps showing the location of each facility and an inventory record defining their characteristics. These documents also serve as the forest development road system plan referenced in the National Forest Management Act.

This environmental analysis includes a detailed transportation plan and on-the-ground route feasibility investigation. All new road construction in all action alternatives would be put into a storage condition except for 2.5 miles. We considered developing an action alternative that built no new permanent roads, however, this would have concentrated timber harvest in high-volume stands in the Point Agassiz area, did not plan for future timber management, and did not adequately address the other resource concerns or opportunities. Alternative 1 would not build any new roads. Alternatives 5 and 6 have numerous opportunities for small sales and would provide an opportunity to maintain and improve the existing road system.

Future timber sales within the project area are highly speculative at this time because they are in the very preliminary stages of planning. For this reason, we have planned for most of the permanent roads to be put into storage.

3-5: See response 2-1 and 2-2.

3-6a: The Forest Plan protects all of the remaining productive old growth in non-development Land Use Designations (Forest Plan, ROD, page 7). Within the development Land Use Designations, about 69% of the existing productive old growth will be maintained throughout the harvest rotation by Forest Plan standards and guidelines. In total, this equates to nearly 90% of the productive old growth existing at the time of Plan implementation remaining unharvested at the end of one rotation.

The small Old-growth Reserves in Alternatives 3 and 6 were designed to increase the amount of the high volume old growth in OGRs compared to the Forest Plan design. In the action alternatives, we have emphasized single-tree selection harvest in the high volume stands which should maintain the old growth features. Alternative 3 harvests no timber within the Point Agassiz high volume stands.

Please refer to 2-1 and 2-7.

3-6b: Using the U.S. Fish and Wildlife Service recommendations in all alternatives would diminish the options for the Responsible Official to choose in considering the direction for land management in the area and narrow the range of alternatives. Other alternatives were designed using other ways to address the significant issues. For example, Alternative 5 responded to creating more economically feasible timber harvest by reducing the amount of specified road and harvesting higher volume stands. Alternative 2 proposed to harvest some of the low volume stands within the proposed USFWS Point Agassiz OGR to create increased forage for moose. Alternative 3 harvests more timber within the Modified Landscape and Timber Production Land Use Designations (LUDs) which allows for more intensive timber management. Alternative 6 displays the OGR designed cooperatively with the U. S. Fish and Wildlife Service with input from the Alaska Department Fish and Game.

3-7: A cumulative watershed effects analysis was done for the Crystal Creek project area (See Table 3-33). Water quality concerns identified during field reconnaissance were addressed in the DEIS and are included in the FEIS. The scope and intensity of watershed analysis is based upon the physical risks and the beneficial uses of the water. The level of analysis conducted was appropriate for this project because of:

- ◆ the amount of proposed harvest is relatively small to the project size,
- ◆ the location of roads and harvest units on stable slopes,
- ◆ the use of Best Management Practices,
- ◆ the adoption of Forest Plan Riparian Standards and Guidelines, and
- ◆ that past management has caused little erosion in this area.

Forest Plan Appendix J states that a Watershed Analysis must be conducted if site-specific adjustments of process group standards and guidelines as provided for in the Riparian Forest-wide Standards and Guidelines are made. No adjustment of Riparian Standards and Guidelines for any stream type (process groups) was proposed.

Appendix J also states that when 20 percent of the trees in a watershed are less than 30 years old, the watershed may be nearing a threshold of concern. This threshold has not been reached in any alternative. The percentages of the watersheds harvested over the past 30 years plus the proposed harvest range from 0 percent to about 11 percent.

3-8: None of the alternatives will result in a significant possibility of a significant restriction to subsistence. Consequently, no ANILCA 810 hearing will be conducted.

As stated in this FEIS, the proposed road closure to motorized access should be an effective method to prevent overharvesting of the Horn Cliff goat population in any alternatives.

3-9: Alternative 5 does not propose building new roads in the Crystal Creek drainage. All but 2.5 miles of new permanent roads are planned to be closed as described in Appendix A. Refer to response 1-6.

3-10: All action alternatives reflect multiple-use management practices consistent with TTRA and the Forest Plan. The development of an alternative focused on moose habitat did not preclude consideration of the needs of other wildlife species and other resources.



Alternative 2 was designed to be most complimentary to moose. Proposed harvest units were designed to create a habitat mosaic for moose only after all Forest Plan Standards and Guidelines were met. Other alternatives had other objectives and met moose habitat needs only when not in conflict with the other considerations. Harvest was not considered on slopes greater than 72% with unstable soils, within riparian, beach, and estuarine buffers, and within old growth habitat reserves. Within the Scenic Viewshed LUD, visual quality was a primary concern and included use of an extended rotation for visual management in the Ess Lake viewshed.

Within the West Muddy Moose Habitat Management Area, Alternative 2 restricted clearcut with reserve units to low volume stands. The only harvest in high volume stands was timber salvage in Units 41 and 42 and single-tree selection in Unit 15. An evaluation of the effects of the alternatives (Table 2-1) indicates that Alternative 2 compares favorably with other alternatives regarding its effect on all wildlife species.

- 3-11: The Stikine Area has been successful in developing and maintaining an annual thinning program utilizing appropriated funds or funds generated from the timber sale (Forest Plan, Page 4-95). Approximately 270 acres of thinning and pruning were funded in 1997 and 500 acres were funded in 1998. We have requested funds to continue this program in future years.
- 3-12: The Forest Service does not develop markets. Markets develop in response to product demand. The research branch of the Forest Service is looking into the structural characteristics of second-growth timber with the Young Growth Mill Study conducted on Prince of Wales Island. A similar study has been done on Wrangell Island. Using this information, timber operators or future timber operators may decide to market such products. The small tree utilization group from the Forest Products Laboratory, Madison, Wisconsin, held a workshop in Petersburg in November 1997 to discuss some of their recent findings.

The IDT considered public input to clearcut some of the existing second growth to maintain forage and concluded that the size of the trees within the units would not make it economically feasible to harvest at this time. Shortening the rotation may be more economically practical when the trees reach a larger diameter size. We believe that we can maintain forage in the short-term by continued thinning and pruning in many of the units and by harvesting low-volume, low-productivity forests.

- 3-13: The alternatives for the log transfer facility presented in the DEIS Appendix C were narrowed down to one design. This alternative was chosen primarily on the economic considerations for reconstruction and maintenance dependent on the amount of volume proposed for this project and reasonably foreseeable projects. The design reconstructs the log transfer facility to accommodate the existing sand and gravel loading facility and a Forest Service dock which would be available for public use. A ramp will be constructed as part of the overall design. The facility was kept as small as possible.

Direct helicopter transfer of the logs was not considered because of the distance from the proposed harvest units to Thomas Bay. A sortyard would be developed inland that would provide upland storage.

A dive survey of the site was conducted in the fall of 1997. Only minor accumulation of bark was found (1997 LTF Monitoring Report).



# United States Department of the Interior

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ER 97/648

December 22, 1997

Mr. Bruce Sims  
U.S. Forest Service  
Tongass National Forest - Stikine Area  
P.O. Box 309  
Petersburg, AK 99833

**Received**

JAN 6 1998  
**Tongass N.F.**

Dear Mr. Sims:

In response to your October 14, 1997, request, we have reviewed the Draft Environmental Impact Statement (EIS) for the Crystal Creek Timber Sale, Tongass National Forest. The U.S. Forest Service (USFS) proposes harvesting approximately 14 to 18 million board feet on the mainland near Point Agassiz, in the Patterson and Muddy River watersheds. We offer the following comments for your consideration.

## GENERAL COMMENTS

4-1 We remain concerned with the effects of the proposed action on fish and wildlife habitats and populations, and we support maintaining opportunities for fish and wildlife-oriented recreation.

## OLD GROWTH HABITAT STRATEGY

### Point Agassiz Peninsula Old Growth Habitat Reserve (OGR)

4-2a The Point Agassiz Peninsula OGR (originally proposed as a draft by Fish and Wildlife Service (FWS) personnel) as shown in Alternative 3, reflects a wildlife-favorable alternative, including maintaining very high volume (Class 6) old-growth forest stands for biological diversity and habitat for old-growth dependent species. We believe that this is important habitat for wildlife because it is the largest remaining contiguous old growth in the area. Volume Classes 6 and 7 represent important winter habitat features (large dominant trees, dense tree canopy, multilayered canopy, and snags) for such species as golden-crowned kinglets, brown creepers, and Sitka black-tailed deer. Brown creepers are associated exclusively with old-growth habitat (Suring et al. 1988, Della Sala et al. 1994), and function as a Management Indicator Species responding to habitat changes. Over half of the 1954 brown creeper habitat capability in this area has been harvested. As indicated by Table 3-21, brown creeper habitat capabilities would continue to decline as a result of this and future timber sales. We believe that the direct impacts of this proposed harvest would be additive, increasing the severity of the effects of weather and the

4-2b

resulting lack of food. Volume Class 6 tends to be used more heavily by deer during winters with deep snow condition (Schoen and Kirchhoff 1990). These stands prevent heavy snow accumulation on the ground, exposing forage for deer and moose and other species that depend on that winter food source. Furthermore, the Draft EIS states that many units in these stands are probably used by nesting Vancouver Canada geese. The FWS suggests deferring, in the Final EIS, Units 1 - 11, 15, 18, 19, 22, 34, 36, 38 - 42, and 87 due to their location in the proposed OGR.

4-2c

Though the Draft EIS included this proposed OGR in Alternative 3, this Alternative also includes actions which conflict with resolution of FWS issues of concern raised in meetings and in letters of March 5, 1997, and June 25, 1997 (e.g., mountain goats, biodiversity, roads, total acres of harvest, and small sale opportunities). We believe that this OGR can be designed to meet wildlife habitat, small timber and firewood harvest, and game hunting needs; and meet Tongass Land Management Plan (TLMP) standards and guidelines. We propose a meeting with USFS personnel to work out the details and a suitable boundary design, so that this OGR can be better evaluated in the Final EIS.

#### Brown Cove OGR

4-3a

The FWS proposed dropping the small knoll northwest of Brown Cove, because productive forest does not connect it with the rest of the forest stands in the reserve. The FWS also recommended adding the southwest end of Crystal Creek watershed to the reserve, as shown in Alternative 3, to maintain the mountain goat wintering habitat and a functional wildlife corridor from the beach and the Horn Mountains to Crystal Creek. We suggest, therefore, that the Final EIS defer timber harvest and road construction in Units 84 and 90. We believe this area will probably remain an important wildlife corridor area and should be included in the OGR in the Final EIS.

4-3b

#### Modifying OGRs

4-4

Though the selected alternative may not include units within the proposed OGRs, we suggest making OGR changes in the Final EIS to maintain the matrix of the old growth during future entries. Furthermore, we believe that Alternative 2, modified to include revised Alternative 3 OGRs, best addresses the wildlife habitat concerns raised by the FWS. As noted above, the FWS has been working on an OGR alternative for the Point Agassiz Peninsula that not only meets the TLMP standards and guidelines, but would provide timber for small operators and firewood gatherers, and would maintain biodiversity and old growth connectivity in the project area. This new OGR would only require deferring Units 41 and 42 in Alternative 2. We suggest discussing this further with the FWS and including it in the Final EIS.

#### OLD GROWTH RESERVE CONNECTIVITY

4-5

We remain concerned about the cumulative effects of this project, in combination with past and future timber harvests in the Thomas Bay area, particularly in relation to long-term species viability. The FWS believes that the small OGRs in the project area could eventually become



4-5 isolated and of reduced value as habitat for some old growth-dependent species, if connectivity with other old growth stands is not maintained. Although OGRs have been established in the project area, we believe that it is important to manage the highly fragmented forested areas between them in such a way that they do not become isolated patches that can no longer sustain old-growth dependent wildlife populations. Natural fragmentation must be clearly understood before further management-induced fragmentation can be properly evaluated (Kiestner and Eckhardt 1994). Habitat connectivity is an important component of a landscape conservation strategy (Kiestner and Eckhardt 1994, Lidicker 1995). Corridors of undisturbed habitat connecting the various non-development Land Use Designations containing old growth stands allow movement of animals between these increasingly fragmented islands of habitat. The Draft EIS acknowledges that the connectivity between the OGRs has been broken. Therefore, we suggest maintaining the best available connectivity between old growth habitat reserves and other natural settings in the Thomas Bay area (XVIII. Landscape Connectivity Standards and Guidelines, P. 4-120), and that the Final EIS include maps showing all non-development Land Use Designations and existing blocks and corridors of old growth habitats, in and near the project area.

#### HIGH HAZARD SOILS, STREAMS, AND FISHERIES

4-6a We believe that any disturbance of highly erosive soils, such as road crossings of stream beds and steep slopes, could have adverse effects on anadromous fish populations due to habitat destruction. We believe that road construction should be avoided in these areas, and that bridges, rather than culverts, should be used on larger fish-bearing streams and that the Final EIS should address these concerns. We also suggest that the number of stream crossings be minimized.

4-6b Furthermore, we suggest that the Final EIS defer from harvest Units 47, 48, 51, 54, and parts of 30, 33, 44, 45, and 55, and the units in the Upper Muddy Area, due to steep slopes and unstable soils.

#### ROAD MANAGEMENT

4-7 We believe the proposal to close all new roads after the completion of the project will reduce unwanted impacts on wildlife. Recent monitoring efforts, in which the FWS participated, have shown inconsistent approaches to "closing" roads. We believe that road removal, with regrading to establish original contours, may be most effective at avoiding future impacts. The methods of road closures in the Tongass have not always successfully precluded continued use, particularly by off-road vehicles. We further suggest that culverts be removed on abandoned roads that remain after the harvest. Otherwise, the culverts are likely to become plugged with debris, and mass failures of the roadbed could result. Sowing the roadbeds with alder seed can accelerate alder growth; cutting alder branches in the fall, and spreading them on closed roadbeds to serve as a seed source is the recommended process. We support closing the bridge into Crystal Creek drainage as an effective method to protect the Horn Mountain goat population. We also suggest that not extending the road past Unit 83 will protect the winter goat habitat farther up the Crystal Creek drainage. We suggest that these issues be further discussed in the Final EIS.

4-8



## MOOSE HABITAT

4-9a We believe that logging should be incidental to moose management, and we do not support harvesting old growth forest to promote an artificially high-level moose population. We suggest that none of the alternatives (e.g., Alternative 2) in the Final EIS be dedicated to management of one species. For example, the estimated number of moose taken in the year 2010 is only 2-3 animals fewer under Alternative 1 than any of the action alternatives, which is not much change. But, for the longer term, the "no action" alternative (Alternative 1) moose habitat capability is greater than the other alternatives, even without thinning. We believe that the 50:50 habitat ratio assumption does not justify clearcutting old growth habitat to create a high moose population for the short term.

4-9b We further believe that the moose model (and all models used for the project) used to determine management strategies requires peer review to ensure its credibility with scientists and resource managers and that this should be elaborated upon in the Final EIS. Though the model uses actual moose data collected in the project area, the assumptions made have not been empirically tested. For instance, the FWS knows of no scientific evidence that the 50:50 ratio of winter moose habitats (old growth forest) and high forage regrowth areas (clearcut units) is the best moose habitat, nor is the effect of this habitat ratio on other species known.

4-9c The moose model identifies "river terraces" as the best moose winter habitat. We suggest that this term be defined in the Final EIS.

4-10a The FWS supports moose management in the second growth units because the project area is important for local subsistence and sport hunting, and for improving the timber growth for harvest that will decrease the necessity to harvest old growth forest in the future. Therefore, the FWS agrees that these areas should be left out of the OGR in the Final EIS so that available funding can be used to manage these stands.

4-10b

## MOUNTAIN GOATS

4-11 The TLMP Standards and Guidelines (WILD 112, XII. A. 3.) state, "Where feasible, maintain mountain goat important winter habitat capability." If the best deer winter habitat in the Upper Muddy area, shown in Figure 3-9, can be used as winter goat habitats, then we suggest that the Final EIS defer from timber harvest the units in the Upper Muddy Area to maintain deer and goat wintering habitats. We also suggest deferring Units 84 and 90 to maintain goat wintering habitats in the Crystal Creek drainage. We believe that the Final EIS should include a map showing where important goat habitats are found.

## ALEXANDER ARCHIPELAGO WOLF

4-12 We believe that any active wolf dens found in the project area should be protected by a buffer, and should be so identified in the Final EIS. We suggest that habitat and geomorphic conditions can determine the size of this buffer and the needed type of management activity in the den area.

## NORTHERN GOSHAWKS

4.13

The Draft EIS states that northern goshawks may be nesting in the project area because USFS staff have sighted several goshawks. We suggest that the Final EIS include continuing annual goshawk surveys in all units included in the proposed or selected alternative, until harvest in those units is imminent. We suggest that Units where goshawk nesting is confirmed be dropped, deferred, or modified to meet the appropriate TLMP guidelines. Furthermore, we recommend against publication in the Final EIS and public distribution of maps showing known goshawk nest sites, as this could potentially result in nest vandalism.

## SPOTTED FROGS

4.14

The Draft EIS states that spotted frogs were found on the Point Agassiz Peninsula and may be in the project area. It also states that the acres where spotted frogs may be affected would be in proposed units or new roads and that if spotted frog habitat is found, then road locations would be altered or buffers would be established around the habitat in harvest units. We believe that the Final EIS should address how the hydrology of the aquatic habitat where the frogs are found will be maintained.

## BALD EAGLES AND OSPREYS

4.15

We suggest that the Final EIS include an evaluation of helicopter logging effects on bald eagles, ospreys, and their nesting sites. We believe that helicopters pose a greater disturbance to these birds than most other human activities and that the conservation measures in the Bald Eagle Conservation Interagency Agreement between the USFS and the FWS, dated June 4, 1990, should be followed.

## WATERFOWL

4.16

The FWS's June letter stated concerns for waterfowl nesting and wintering habitat in the project area. The FWS's proposed Point Agassiz OGR would defer those units from harvest that are most likely used by nesting Vancouver Canada geese (Units 22, 34, 36, 38 - 42, and parts of units 19 and 87). We believe this should be considered in the Final EIS.

## WETLANDS, BEACHES, AND RIPARIAN ZONES

4.17

Proposed project alternatives include rerouting the washed out sections of Road 6256 along the Muddy River to run within the adjacent wetland and providing erosion control to prevent more river-caused road erosion. However, for the long-term, we suggest that there is no guarantee that the proposed erosion control method will prevent future erosion by river. Future road relocations, we believe, can reasonably be expected, thus causing further wetland losses by siltation, disturbance, habitat loss, or changing water level. We suggest that the Final EIS discuss rerouting the road away from the river and adjacent riparian habitats to a location with the least impact on the river and associated wetlands. We further suggest that the Final EIS continue to


address erosion control for this area to prevent the threat of this wetland being drained into the river. This wetland receives high wildlife use (e.g., moose, beaver, waterfowl, and passerines).

#### SPECIFIC COMMENTS

- 4-18a Chapter 1, pages 14 and 15. We believe that many of the issues listed as "Outside the Scope of This Project" are in fact within it and should be addressed in the Final EIS. Comment number four, for example, expresses skepticism regarding the quality of the pellet count study. The quality of field data used for project impact analysis is definitely within the scope of this project.
- 4-18b The USFS response to comment number five states that the decision to barge or raft logs is outside the scope of this project because that decision "will be made by of the U.S. Army Corps of Engineers." We believe it is the Acting Forest Supervisor, who is responsible for this aspect of the sale and who will apply for Corps Section 404 permits for the proposed log transfer facility and who will ensure that the appropriate permits are obtained and that required mitigative actions be taken. Furthermore, we believe that the method of transfer for the timber harvested during this sale is within the scope of this project.
- 4-19 Chapter 1, page 17. The Draft EIS states that the Biological Assessment has been reviewed and approved by the FWS, when in fact the FWS has not received a copy of the Biological Assessment. This needs corrected. We request that a copy of the Biological Assessment be sent for review to: U.S. Fish and Wildlife Service, 3000 Vintage Blvd. Suite 201, Juneau, AK 99801.
- 4-20 Chapter 3, page 42. We believe there may be a discrepancy between the figures of volume class 6+ remaining in this paragraph and Table 3-20, Alternative 1.
- 4-21 Chapter 3, page 45, second paragraph. The Draft EIS states that "Model outputs are generally expressed in terms of population numbers." We suggest that this sentence be changed to, "Model outputs are generally expressed in terms of habitat capability to maintain a certain animal population number."
- 4-22 Chapter 3, page 79, paragraph 7. The Draft EIS refers to the roadless areas inventory in Forest Plan Appendix C. We believe the correct reference is the Forest Plan Final EIS Appendix C.

We request copies of the completed Crystal River Wildlife and Timber Resource reports to be sent to: U.S. Fish and Wildlife Service, Southeast Alaska Ecological Services, 3000 Vintage Blvd., Suite 201, Juneau, Alaska 99801. If you have any questions about our comments, please contact Ms. Carol Hale, FWS, at (907) 586-7240. We appreciate the opportunity to comment on the Draft EIS.

Sincerely,

  
for Regional Environmental Officer - Alaska

## LITERATURE CITED

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- Lidicker, W.Z. ed. 1995. Landscape approaches in mammalian ecology and conservation. Univ. Minnesota Press. Minneapolis.
- Schoen, J.W. and M.D. Kirchhoff. 1990. Seasonal Habitat Use by Sitka Black-Tailed Deer on Admiralty Island, Alaska. J. Wild. Manage. 54(3):371-378.



## Forest Service Responses to the United States Fish and Wildlife Service

- 4-1: The Forest Service supports maintaining opportunities for fish and wildlife-oriented recreation. With any of the action alternatives proposed, there will continue to be fish and wildlife-oriented recreation opportunities in the Thomas Bay area. The proposed Ess Lake Shelter in Alternatives 2, 5, and 6 will enhance recreation opportunities.

See responses for specific fish and wildlife habitat and population concerns (4-11a, 10-22, 4-6a, 10-28).

- 4-2a: Please refer to response 2-1.

- 4-2b: Alternative 3 includes the OGR initially proposed by the U.S. Fish and Wildlife Service which would defer all these units. For the Point Agassiz OGR in Alternative 6, the IDT and the U.S. Fish and Wildlife Service designed an OGR that would defer units 22, 34, 36, 38-42 from timber harvest. Alternative 2 would only harvest Units 2, 3, 4, 7, 8, 9, 41, and 42. Alternative 5, which harvests all these units, incorporates mitigation measures such as single-tree selection.

The Standards and Guidelines for high waterfowl use areas (Forest Plan p. 4-115) have been incorporated into the mitigation measures for Units 1, 5-7, 10-11, 15, 18, 19, 22, 34, 36, 38-42 plus Units 25, 26, and 31. These mitigation measures include a timing restriction to restrict logging activities from April 1 to July 31 and use of uneven-aged management. Harvest would generally be either single-tree selection which would remove 20% of the stand or group selection with removal ranging from 30% to 40% of the stand. Units 2, 3, 4, 8 and 9 have not been identified as having a high likelihood for goose-nesting, but would have retention of reserve trees and snags as part of the clearcut with reserve prescription (Appendix A).

- 4-2c: Please refer to 2-1.

- 4-3: Please refer to 2-7 and 4-8. We have included Units 84 and 90 in the proposed OGR in Alternatives 3 and 6.

- 4-4: Please refer to 2-1 and 2-7.

Alternative 6 was based on modifications to Alternative 2. Alternative 6 includes the Point Agassiz small OGR designed cooperatively by the U. S. Fish and Wildlife Service and the Forest Service to meet both the Forest Plan criteria, provide timber for small operators, and protect more high volume stands; the Brown Cove small OGR from Alternative 3 designed by the U.S. Fish and Wildlife Service; and the Delta Creek small OGR modified by the Crystal Creek IDT to include adjacent old-growth in a non-development LUD (Patterson Glacier Special Interest Area) and to avoid some previously harvested units.

The proposed OGR in Alternative 6 would not harvest Units 41 and 42.

- 4-5: Landscape reserve connectivity between the medium Old-Growth Reserve to the north of the project area and the medium Old-growth Reserve to the south (Stikine-LeConte Wilderness) has been provided in accordance to Forest Plan direction (p. 4-120). See figures 3-5 to 3-7.

Productive old-growth, non-developmental LUDs, Old-growth Reserves, and the major stream systems are shown on the Alternative maps in Chapter 2 and the old-growth reserve maps in Chapter 3. Riparian corridors were not shown on these smaller scale maps but are shown on the unit card maps.

Please refer to 2-1.

- 4-6a: Road routes avoid highly erosive soils, including those found at stream crossings. Temporary bridges will be used on several smaller streams where the road will be closed after harvest activities are completed. See Road Cards in Appendix A for proposed bridge locations.

See response 7-2.

- 4-6b: Field review, since distribution of the DEIS, has found that portions of Units 30, 33, 47, 48, 51, and 54 are on steep unstable slopes. Units 47, 48, 51, and 54 have been dropped from consideration for logging on this

timber sale. These units were incorporated into the design of the landscape connectivity corridor which connects the Muddy River watershed to the Patterson River Watershed. In addition, the east portions of Units 30 and 33 were deleted. Alternative 3 units located in the Upper Muddy River area would avoid or minimize disturbance on soils through the use of helicopter logging and group selection. Field review of Units 44, 45, and 55 did not indicate unstable slope conditions.

- 4-7: We generally do not reestablish original contours unless on-the-ground evaluation indicates that such a treatment is needed to mitigate instability or long-term visual impacts at a specific location. No location is known to exist under any proposed alternative.

We discourage off-road vehicle use but realize that some use may occur where drainage structure removal would not provide a sufficient barrier. This use will be limited since the road system does not connect to a community and all vehicles have to be transported by boat to the area. This use will diminish over time as the roads close over with alder.

We believe that spreading alder branches in order to provide a seed source is not necessary. Our experience has been that alder establishes naturally after road closure. This has been especially true in the Crystal Creek project area. We have had to brush the existing road system to keep it from closing in with alder.

- 4-8: Several measures were adopted to effectively address the concerns about the mountain goat population at Horn Cliffs. We designed a motorized closure at the bridge crossing of the Muddy River in all action alternatives that would enter the Crystal Creek drainage. In addition, a locked gate or barrier would be placed on the Muddy River bridge and some drainage structures would be removed from the road system within the Crystal Creek drainage.

Since Alternative 4 has been dropped from further consideration in the FEIS, no alternative extends the road past Unit 83 in the Crystal Creek drainage. In Alternatives 3 and 6, the area south of Unit 83 would be included in the Brown Cove OGR. Road construction ends at Unit 78 in the Crystal Creek drainage in Alternative 6 which further protects winter goat habitat. Alternative 5 does not enter the Crystal Creek drainage.

- 4-9a: See response to 2-2, 2-5, and 3-10.

- 4-9b: See response to 2-5. The 50:50 ratio was suggested by Doerr, 1984. He reviewed the existing literature for moose habitat management in North America as well as available moose habitat studies in the Sukine Area. Management of moose habitat in coniferous forests have generally consisted of an attempt to balance the need for early seral stages with the need for forested winter range (Eastman, 1974, Peek et al. 1976, Parker and Morton 1978, Hamilton et al. 1980, Welsh et al. 1980).

- 4-9c: Thank you for your suggestion. River terrace has been added to our glossary. A river terrace is one of a series of level surfaces in a river valley flanking and more or less parallel to the channel. It is above the level of the stream, and represents the dissected remnants of an abandoned flood plain produced during a former stage of erosion or deposition.

- 4-10a: See response to 3-10 and 8-1.

- 4-10b: Alternative 1 (the Forest Plan design) included two stands within the Delta Creek OGR and portions of managed stands in the Point Agassiz OGR.

Old-growth Reserves in Alternatives 2 and 5 were modified to exclude managed stands. Managed stands were not excluded in the Point Agassiz Old-Growth Reserve for Alternative 3 to maintain a contiguous landscape block. Several small one-acre patches were included in the Point Agassiz OGR for Alternative 6.

- 4-11: See response to 2-7.

Most units proposed for harvest in the Upper Muddy River area use group selection silviculture system which should minimize impacts on goat and deer winter habitat. Only Alternative 3 proposes harvest within the upper Muddy River.

A map of the goat winter habitat is included in the FEIS (Figure 3-29). As the map shows, most of the best goat winter habitat is north of the Muddy River on the south-facing slope where no timber harvest is proposed in any alternative.

- 4-12: If any active wolf dens are found, we will protect them with a buffer according to Forest Plan Standards and Guidelines (page 4-117).
- 4-13: Goshawk surveys were conducted for the Crystal Creek project area during field seasons, 1996 and 1997. In late July 1998, a goshawk nest was found adjacent to proposed Unit 50. Since analysis for the project had been completed, Unit 50 and 1.2 miles of road were dropped from the Selected Alternative in the Record of Decision but are still shown in the FEIS analysis. If other nests are found during unit layout, additional buffers will be established (Forest Plan pages 4-90 and 4-91).
- 4-14: Spotted frogs have been found along Road 44900. This route will be designed to avoid the open muskegs where frogs have been found. Natural drainage patterns along the road will be maintained wherever possible.
- 4-15: There are no helicopter-logging activities proposed near any known or likely eagle or osprey nesting habitat in any of the alternatives. The Bald Eagle Interagency Agreement will be followed.
- 4-16: See response to 4-2b.
- 4-17: We adjusted the road location as suggested. See response 1-10. The erosion control work along the Muddy River is included as a wetland stabilization project, see Appendix A.
- 4-18a: We have clarified our paraphrasing of the comment to make it clearer why it was outside the scope of this project. Developing and validating peer-reviewed studies is not part of a project-level analysis or the NEPA process.

The data used is the best available, and we have recognized its limitations. We have taken a conservative approach and assumed that single-tree selection logging using a 20% removal will maintain winter habitat use, not double or triple use as suggested by the actual field data.

An inter-agency field review of the partial harvest areas was conducted in May 1997 by wildlife biologists from U.S. Fish and Wildlife Service, Alaska Department of Fish and Game, and the Forest Service. Field examination of the partial harvest study area provides an indication that the habitat is providing winter range for deer and moose. Field data collected to date suggests that both deer and moose are using the partial harvest area more than the adjacent, unlogged old growth.

- 4-18b: You are correct, it is the [Assistant] Forest Supervisor's decision. See the FEIS pages 1-14 and 3-76.
- 4-19: The DEIS was incorrect in stating that the Biological Assessment had been reviewed and approved by U.S. Fish and Wildlife Service and National Marine Fisheries Service. Since then, the Biological Assessment has been completed and approved by both agencies.
- 4-20: The "discrepancy" between the two numbers is that one included State land and the other number refers to National Forest land only. We have corrected this in the FEIS. Table 3-18 shows the amount of Volume Class 6+ on National Forest land only since this is the only land we would manage.
- 4-21: This has been changed to follow your suggestion.
- 4-22: You are correct, the reference for Roadless Areas on DEIS page 3-54, should read Tongass Land and Resource Management Plan, Final Environmental Impact Statement, Appendix C.



12/23/97

DEC 23 1997

**Tongass N.F.**

P.O. Box 251  
Petersburg, Alaska  
99833  
December 23, 1997

Bruce Sims  
USDA Forest Service, Stikine Area  
P.O. Box 309  
Petersburg, Alaska 99833

COMMENTS REGARDING CRYSTAL CREEK DEIS

Dear Mr. Sims,

My name is Eric Lee. I am an Alaskan whose family has depended on the forests and waters of the Tongass for subsistence and livelihood for over three generations. As the years go by I see the once-unthreatened and magnificent forests I remember from my youth steadily being reduced to a mere patchwork forest with many of the most important areas for the long-term survival of fish and game already deforested, and much of what is still intact going on the chopping block at an alarming rate.

With each sale, more prime habitat is removed from the Tongass. In almost every case, the areas of high timber volume that are cut are also the areas most essential for the long-term ecological stability of the whole surrounding watershed *or mountainside.*

This disturbs me greatly. By cutting out the core habitat from a forest, the whole surrounding area is put at risk. In one way or another, animals of all kinds are stressed and their survival is jeopardized. Under the Forest Service's management, the Tongass is steadily becoming a patchwork forest, with much of the most essential habitat destroyed. If this continues, it is only a matter of time before the Tongass becomes another region of "minimal viable populations" and endangered species.

Time and time again I see reassuring platitudes in the media from the Forest Service and our politicians stating how little of the total area of the Tongass is actually going to be cut. What needs to be fully and publicly acknowledged by the Forest Service is that the areas that have been harvested and the areas that are being planned for cutting contain the habitat most essential for the well-being of all the animals that live in the whole surrounding area. By continuing to not acknowledge that it is systematically eliminating the most essential



habitat from the Tongass, the Forest Service is deceiving the public and putting at risk all the animals it is required by law to protect.

5-1

In reviewing the Crystal Creek DEIS it is plain to see that all of the alternatives cut much of the remaining prime habitat from the Patterson and Muddy river drainages. In decades past a huge amount of timber, about 160 mmbf, was taken out of that area. The old growth forest that remains there is very important, not only for the animals that depend on it, but for the people of Petersburg who go there for subsistence hunting.

5-2

I firmly believe that what is left should be carefully managed in small sales that do as little as possible damage to habitat and benefit the local independent logging operators.

5-3

There is no need for the proposed sale to be as large as it is. Contrary to section 101 of TTRA which clearly states that timber sales offerings must not be in excess of actual market demand, timber sales planning in the Tongass far exceeds the market demand as estimated by the Brooks and Haines report. To avoid a violation of section 101 the Forest Service should scale this sale back to a level that is in line with the requirements of the TTRA.

5-4

All the units on unstable soil and steep slopes should be eliminated. If there is to be any logging on steep slopes at all it should be very selective helicopter logging, not helicopter clear-cutting. That's only common sense. Sometimes it takes 10 or 20 years before the soil on a steep denuded hillside erodes to the point where it collapses. But if and when any landslides do occur, you and the other decision-making people in the Forest Service will be held accountable. Remember that landslides remain clearly visible for decades.

5-5

Being the first sale to come out under the new Tongass Plan, the Crystal Creek Sale should be representative of a new approach to managing the forest. Yet none of the proposed alternatives reflects much if any of the balanced management and market demand considerations which should have been implemented. In fact none of the alternatives steer clear of violating the protections required by law under the TTRA and NEPA. The most constructive comment I have to offer is to urge you to prepare an alternative which eliminates the logging on steep and unstable slopes, and sticks to the present road system as much as possible. A scaled-down alternative would save valuable habitat and at the same time minimize the legal risks inherent in the

present proposed alternatives.

I submit these comments to you in the spirit of constructive participation, and hope you consider them as such.

Sincerely,

A handwritten signature in cursive script, reading "Eric Lee". The signature is written in dark ink and is positioned to the right of the word "Sincerely,".

### Forest Service Responses to Eric Lee

- 5-1: The action alternatives harvest only a small percentage of the remaining high volume forest stands in the Muddy and Patterson River drainages. See Tables 3-18 (vol. 6+) and 3-34 (watershed percentages). The prime habitat varies according to species. For example, there is little proposed harvest in the highest-value goat habitat. Deer and marten habitat capability is lowered by no more than 2% in all proposed action alternatives (Table 3-20 and 3-22). Over 80% of the remaining highest volume class 6+ old growth is left unlogged in every alternative (Table 3-18).
- 5-2: The timber volume is currently planned to be sold under the Small Business Administration (SBA) program. Mitigation measures to protect the environment have been incorporated with unit design and silvicultural prescriptions. Mitigation measures will also be part of the timber sale package as contract clauses.
- 5-3: A timber sale usually takes from three to five years to complete all resource inventory, environmental analysis, sale layout, cruising, appraisal, and advertisement. For example, the planning for Crystal Creek Timber Harvest started in the spring of 1996 and the first sale that may be offered would be in 1999. The amount of timber volume involved in planning at one time may be considerably more than what will be offered in any given year (Forest Plan 4-95). Any volume from the Crystal Creek Timber Harvest EIS is planned to be offered over several years.
- 5-4: Please refer to response 4-6b.
- 5-5: Please refer to response 3-2, 3-4, 4-6b and 10-16.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 10  
1200 Sixth Avenue  
Seattle, Washington 98101

December 23, 1997

Reply To  
Attn Of: ECO-088

Ref:96-093-AFS

Bruce Sims  
Tongass National Forest  
P.O. Box 309  
Petersburg, Alaska 99833

**Received**  
**DEC 29 1997**  
**Tongass N.F.**

Dear Mr. Sims:

The Environmental Protection Agency (EPA) has reviewed the draft Environmental Impact Statement (draft EIS) for the proposed **Crystal Creek Timber Harvest** in accordance with our responsibilities under the National Environmental Policy Act and §309 of the Clean Air Act. The draft EIS analyzes a no action alternative and four action alternatives to harvest between approximately 14 and 18 million board feet of timber from a project area located roughly seven to twelve miles northeast of Petersburg, Alaska. The draft EIS does not identify a preferred action alternative.

We are pleased to see that many of the topics/issues identified in our scoping comments have been addressed in the design of the proposed action alternatives. We believe that the use of buffers prescribed in the Riparian Standards and Guidelines of the 1997 Tongass Land Management Plan (TLMP), the use of temporary bridges, the obliteration of all temporary roads, the avoidance of wetlands and steep slopes, and the use of non-clearcutting harvest techniques will provide for significant protection of resources within the project area. While we are relatively comfortable with many of the elements of the action alternatives presently being considered, we have the following concerns that should be addressed in the final EIS.

**Thomas Bay Log Transfer Facility (LTF)**

61  
We are concerned with the lack of specificity in how the existing Thomas Bay LTF would be reconstructed and operated with the implementation of any of the proposed action alternatives. While the information presented in Appendix C provides useful information related to options available for modifying the LTF, we were unable to determine what design would ultimately be employed, along with the environmental impacts associated with the operation of the LTF. We recommend that the final EIS provide additional information related to design and operation of the Thomas Bay LTF, how the LTF would conform with the Alaska Timber Task Force's *Log Transfer Facility Siting, Construction, Operation and Monitoring/Reporting Guidelines*, and a disclosure of the potential environmental impacts from LTF operation. We also recommend inclusion of the 1997 dive survey report as an appendix to the final EIS.

In general, the EPA supports alternatives to log transfer which would minimize or avoid



6-1 the direct, indirect, and cumulative impacts to the marine environment. The direct transfer of logs from land to a barge would avoid and minimize the adverse impacts of bark discharge, accumulation, shading, and compaction associated with log transfer, rafting, and storage.

### Mitigation Measures

6-2 We recommend that the final EIS include greater discussion of the mitigation measures that would be employed with the selected alternative. While we appreciate the intent of the Forest Service to minimize the length of the document, we find it difficult to determine the mitigation measures to be used by relying solely on the unit and road cards presented in Appendix B. We believe that a summary table of mitigation measures (including identification of and/or reference to applicable Forest Service (and other relevant) direction should be included in Section 2 of the final EIS to provide the decision maker and the public a clearer understanding of the measures to be taken to mitigate impacts associated with project implementation.

### Purpose and Need

6-3a We believe there are issues related to National Environmental Protection Act (NEPA) implementation that arise by explicitly specifying a harvest volume in the purpose and need section of the draft EIS. For example, in stating that the needed volume from the proposed project is approximately 16 million board feet (MMBF), it appears that the range of alternatives has been unnecessarily limited to those that would meet the specified volume. Furthermore, in defining a specific volume for this project, we have concerns that critical decisions in the planning process (i.e., determination of the target volume) may have been made without adequate public involvement.

Additionally, we have concerns that the specification of a target harvest volume in the purpose and need section of the draft EIS may conflict with the Forest Service's stated direction of using "ecosystem management" in their decision-making process. We are concerned that in defining a target volume in the purpose and need statement of the EIS, it appears that the Forest Service may be managing the ecosystem "around" the desired timber harvest level instead of identifying the elements needed to maintain a healthy ecosystem and evaluating the project alternatives in relation to those needs. We believe that a management approach which is driven by pre-defined harvest levels will not ensure maintenance of a truly healthy ecosystem within (and outside) the project area.

6-3b While Appendix A presents a useful discussion of timber demand on the Tongass and how the Stikine Area is expected to contribute to meeting that demand, we are still unable to determine the basis for the 16 MMBF target volume that is presented as part of the purpose and need. Appendix A appears to be justifying the harvest volume by stating that the "proposed harvest of 16 MMBF from the Crystal Creek Project Area is reasonable and valid" because it will contribute to the average annual volume of 77 MMBF assigned to the Stikine Area on lands using standard logging technology. Unfortunately, Appendix A does not present how the 16 MMBF was derived for the proposed project area.

We recommend that the final EIS either 1) eliminate the target volume of 16 MMBF from the purpose and need or 2) clearly discuss the process/methodologies used in determining the

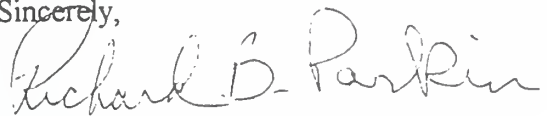
target harvest volume identified as a project purpose.

6-4 [ Based on these concerns, we have rated the draft EIS EC-2 (Environmental Concerns - Insufficient Information). This rating and a summary of our comments will be published in the *Federal Register*. A summary of the rating system used in our review is enclosed for your reference.

We are interested in working closely with the Forest Service in the resolution of these issues and I encourage you to contact Bill Ryan at (206) 553-8561 at your earliest convenience to discuss our comments and how they might best be addressed.

Thank you for the opportunity to review this draft EIS.

Sincerely,



Richard B. Parkin, Manager  
Geographic Implementation Unit

Enclosure — 11-1

cc: Kevin Hanley, ADEC  
Ralph Thompson, ACOE-Juneau

## **Forest Service Responses to U.S. Environmental Protection Agency**

- 6-1: See Appendix A for the proposed log transfer facility design. This design will allow for multiple uses and all appropriate state and federal laws and regulations will be followed.

See response to 3-13.

- 6-2: Mitigation measures are found in the FEIS on pages 2-20 through 2-22. Also, see the introduction to the Activity Cards, Appendix A. To minimize the length of the document, we avoided repeating narrative given in the Forest Plan or other commonly available documents. Where appropriate, we cite the sections of the Forest Plan that were used in our analysis.

- 6-3a: See response 3-1a.

The selected alternative could include none, a few, or all units displayed in the alternatives. The IDT reviewed public comments from the DEIS and conducted additional analysis before developing Alternative 6 which is the IDT Preferred Alternative. The IDT believes this alternative best integrates the range of public comments, field inventory, resource analysis, and Forest Plan direction.

- 6-3b: *Reasons for Scheduling the Crystal Creek Timber Harvest* (DEIS Appendix A) has been updated and explains how 16 MMBF was derived for the project area and is in the planning record. Briefly, the amount of volume is based on the amount of tentatively suitable timber in the project area, the amount previously harvested, and the rotation age for timber harvest, the availability of timber in adjacent areas, and the implementation of the Forest Plan.

- 6-4: We recognize that state and federal agencies may require more technical information than the general public for whom the EIS is prepared. Any additional information may be obtained by contacting our office.

# STATE OF ALASKA

TONY KNOWLES, GOVERNOR

## OFFICE OF THE GOVERNOR

OFFICE OF MANAGEMENT AND BUDGET  
DIVISION OF GOVERNMENTAL COORDINATION

☐ SOUTHCENTRAL REGIONAL OFFICE  
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December 26, 1997

Mr. Bruce Sims  
U.S. Forest Service, Stikine Area  
P.O. Box 309  
Petersburg, AK 99833

**Received**  
**JAN 2 1998**  
**Tongass N.F.**

Dear Mr. Sims:

SUBJECT: CRYSTAL CREEK TIMBER SALE  
STATE I.D. NO. AK 9711-03JJ  
PROPOSED CONSISTENCY FINDING

The Division of Governmental Coordination (DGC) has coordinated the State's review of the U.S. Forest Service's (FS) consistency determination for the Crystal Creek Timber Sale. The FS provided a consistency determination on page 16 of the DEIS, finding the harvest activity consistent, to the maximum extent practicable, with the Alaska Coastal Management Program (ACMP).

This sale proposes to harvest between 14 and 18 MMBF of timber from approximately 1,014 to 1,799 acres, and to construct between 16 and 23 miles of permanent and temporary road, depending on alternative. The estimated 64,000 acre Crystal Creek Project Area, located on the mainland, is approximately 7-12 miles northeast of Petersburg, Alaska. Timber harvest from this project is planned for offering in 1999.

7-1 [ One existing log transfer facility (LTF) at Thomas Bay would be reconstructed. The modifications to this facility would require a separate ACMP consistency review, and be subject to any necessary State and/or federal permitting authorities.

### Consistency Finding

The State has three broad areas of concern for coastal resources affected by federal timber harvest activities: fish and fish habitat, wildlife and wildlife habitat, and water quality. The State enforceable policies that address these concerns are found in the Alaska Forest Resources



and Practices Act (FPA) and its implementing regulations.

The State reviewed the proposed timber harvest activity to determine if state coastal resource concerns are adequately addressed and to determine if the State agrees that the activity is consistent, to the maximum extent practicable, with ACMP enforceable policies. The State concurs with the FS determination of consistency, provided the following alternative measure is employed during project implementation:

1. Temporary bridges, rather than culverts, shall be installed for the Class II stream crossings at MP 2.8 of the 44920 Road and at MPs 0.65 and 1.0 of the 44990 Road.

7-2 Although the DEIS (page 3-101) states that "*Bridges will be considered for stream crossings when culverts cannot maintain acceptable fish passage,*" according to the cards for Roads 44920 and 44990, three 60-inch culverts are proposed for installation in Class II streams where the gradient exceeds 10 percent at the crossing sites. Specifically, these sites occur at Milepost 2.8 on the 44920 Road, and at Mileposts 0.65 and 1.0 on the 44990 Road. As these structures would be incapable of providing upstream fish passage, their installation would be inconsistent with AS 16.05.840 (the Fishway Act). Consequently, bridges, rather than culverts, must be installed at these locations to ensure that fish passage is maintained. DEC contacted Bruce Sims (IDT Leader) regarding this issue, and he agreed that temporary bridges should be used in lieu of the proposed culverts.

The alternative measure is necessary to ensure the continued free and uninterrupted passage of resident fish at these stream crossing locations, and to comply with AS 16.05.840 (the Fishway Act)

The State is able to concur with the Forest Service's consistency determination for this timber sale based in, large part, on the close coordination that was provided by the Interdisciplinary Team Leader during project planning, and on the fact that all of the new roads constructed for this project will be effectively closed consistent with the standards of 11 AAC 95.320 upon completion of timber sale activities. In addition, the proposed full implementation of the TLMP process group standards and guidelines (RIP2, III, F) along all Class I, II, and III streams within the project area provides reasonable assurance that yarding will be carried out consistent with the standards of 11 AAC 95.360(a).

### Adequacy of Information

7-3 Overall, we appreciated the concise format of the DEIS and the non-technical manner in which the information was presented. In particular, we were very pleased to see the site-specific stream crossing structure information that was included in the road cards in Appendix B. While we realize that the sizes and types of the proposed crossing structures are preliminary, and will ultimately depend on cost and other factors considered during final road layout, this type of information is extremely useful in that it provides an indication of the channel characteristics at

7-3 [ the crossing sites, including stream width, gradient, incision depth, substrate, and the type of fish habitat present.

#### Advisories

7-4 [ Please be advised that you are required to meet all applicable State and federal laws and regulations. Your consistency finding may include reference to specific laws and regulations, but this in no way precludes your responsibility to comply with other applicable laws and regulations.

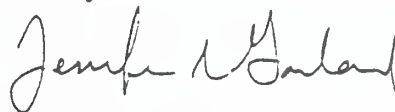
If changes to the approved project are proposed prior to or during its siting, construction, or operation, you are required to contact this office immediately to determine if further review and approval of the revised project is necessary. If the actual use differs from the approved use contained in the project description, the State may amend the this consistency finding.

7-5 [ Should cultural or paleontological resources be discovered as a result of this activity, we request that work which would disturb such resources be stopped, and that the State Historic Preservation Office be contacted immediately (269-8720).

Relative to Tongass Land Management Plan implementation only (not for ACMP consistency purposes), are attached comments received from the Department of Fish and Game, Division of Wildlife Conservation.

If you have any questions regarding this process, please contact me at 465-3177 or email Jennifer\_Garland@gov.state.ak.us.

Sincerely,



Jennifer R. Garland  
Project Review Coordinator

Enclosure

cc:

\*\* Kevin Hanley, DEC, Juneau  
\*\* Jack Gustafson, DFG, Ketchikan  
Lana Shea Flanders, DFG, Juneau  
Jim McAllister, DNR, Juneau  
Judith Bittner, DNR/SHPO, Anchorage  
Leo Luczak, Coastal District, Petersburg  
Buck Lindekugel, SEACC, Juneau  
Tom Waldo, SCLDF, Juneau

\*\*=email, \* = fax

## **Forest Service Responses to the Alaska Department of Government Coordination**

- 7-1: The final design for the LTF will be forwarded to the State for an ACMP review. All necessary State and Federal permits will be obtained.
- 7-2: Temporary bridges, rather than culverts, are proposed for the Class II stream crossings at milepost 2.8 of Road 44920, mileposts 1.15 and 2.0 on Road 44900, and at mileposts 0.65 and 1.0 of Road 44990. See Appendix A for road card descriptions.
- See response to 1-4.
- 7-3: Thank you.
- 7-4: We are aware of our legal responsibilities and will implement all applicable State and Federal laws and regulations. We will contact your office if changes to the approved project are made.
- 7-5: If additional cultural or paleontological resources are discovered, all ground disturbance activities that may disturb these resources will cease and the State Historic Preservation Officer will be contacted:
- See response to 10-4.

# STATE OF ALASKA

## DEPARTMENT OF FISH AND GAME

### SOUTHEAST REGIONAL OFFICE HABITAT AND RESTORATION DIVISION

TONY KNOWLES, GOVERNOR

P.O. BOX 240020  
DOUGLAS, AK 99824-0020  
PHONE: (907) 465-4287  
FAX: (907) 465-4272

23 December 1997

Bruce Sims, IDT Leader  
Crystal Creek EIS  
US Forest Service  
Stikine Area  
PO Box 309  
Petersburg, Alaska 99833

Dear Mr. Sims:

These are the NEPA comments of the Alaska Department of Fish and Game for the Crystal Creek Timber Sale in the Petersburg Ranger District. Funding and personnel shortages have limited our ability to comment on the following wildlife-related issues.

We were pleased that the Forest Service contacted us early in the planning process for this sale. Although we would have preferred to be more involved in development of alternatives, we appreciated the numerous contacts by the project wildlife biologist and IDT leader on sale issues, particularly regarding the review of small old growth habitat reserves. We made comments on that issue in a previous letter.

#### Moose

8-1 We are glad the Forest Service is considering logging techniques which will be somewhat beneficial to moose. We note that the Forest Service's analysis in the DEIS suggests that continued conversion of old growth into second growth will not maintain moose habitat in the long run. In our view, maintaining moose habitat and forage areas would be best accomplished by taking some of the clearcut areas out of timber production and keeping them in early seral stages. Converting old growth to second growth not only will not maintain moose in the long run, it will be detrimental to other species dependent on old growth. Although the Forest Service is proposing timber harvest methods less detrimental to moose, timber harvest is still driving the Crystal Creek project and moose are a secondary consideration. We would have been interested to see a project alternative that reversed that approach for a change.

#### Roads

8-2 ADF&G supports the Forest Service plan to close new roads in the project area after Crystal Creek sale operations cease. Existing roads are used by hunters in the Thomas Bay area but we believe the existing system is extensive enough to permit hunters adequate access to wildlife. We would prefer that no new road be built in the Crystal Creek drainage. If a road is built, closing it at the Muddy River crossing

8-3 would be important to help prevent excessive harvest and disturbance of the Horn Cliffs mountain goat population.



8-4

Deer habitat capability

See letter from the principal authors of the wolf population assessment for the TLMP revision (Person, et. al. to Pendleton 9/19/97) for explanation as to why it is not valid to add deer to HSI model outputs to determine prey availability for wolves as is done in Table 3-25.

8-5

The DEIS assumes a higher deer carrying capacity for second growth with thinning and quantifies that increase by extending the period clearcut values in the HSI model apply to the cutover areas. This method likely overestimates the value of thinning to deer carrying capacity. The values for clearcuts in the HSI model are average values over the estimated 25 year life of clearcuts. In reality the value of clearcuts to carrying capacity is higher in the early years and diminishes as the clearcut ages. Thinning would delay the time when canopy closure occurs and so extend the "life" of a clearcut; but because the less valuable portion of a clearcut's life is the part extended, the value of a clearcut after it has been thinned is less than the 25-year average represented by the HSI value. Conceptually then, thinned, long-lived clearcuts should have a lower average value than short-lived unthinned ones, and although that value may be higher than second growth, it should not be as high or as beneficial to deer as depicted in the DEIS tables 3-24 and 3-25.

8-6

High volume

Our primary concerns about high-volume old growth were presented in our letter about TLMP implementation of the review of small Habitat Conservation Areas. We note here, however, that timber type maps we received during scoping for this project showed the last remaining stands of volume class 7 in the project area coincide almost exactly with timber harvest units 10, 11 and 15. Unit 15 is slated for 20-60% basal area removal in 3 of 4 action alternatives which would eliminate it as a VC 7 stand. We urge that at least one of these units be deferred permanently from harvest to maintain some remnant of the VC 7 forest vegetation type for biodiversity reasons. The stand could also function as a control unit for the proposed selective harvest study.

Thank you for the opportunity to comment.

Sincerely,



Lana Shea Flanders  
Regional Supervisor

cc: Janet Kowalski, ADF&G  
Kim Titus, ADF&G  
Jennifer Garland, DGC  
Nevin Holmberg, USFWS  
Jack Gustafson, ADF&G  
Ed Crain, ADF&G  
Kevin Hanley, ADEC

## Forest Service Responses to the Alaska Department of Fish and Game

8-1: See response to 3-10.

Although shortening the rotation is allowed by NFMA for other than timber resource objectives, conversion of sites with high timber productivity to forage production does not seem necessary. We believe that we can maintain forage in the short-term by continued thinning and pruning in many of the units. The units that are planned to be harvested by the clearcut with reserve method for forage production are mostly lower-volume stands which are less valuable for species that use old growth.

8-2: Most new road construction is proposed for closure. Road 44900 is on relatively flat terrain which will make it difficult to keep closed. Consequently, 1.15 miles of that road will remain open and the remainder will be closed at a stream crossing where a temporary bridge will be removed. The road that parallels the Muddy River, Road 6256, will be relocated and approximately 1.6 miles will be realigned. This will expand the existing road access by 2.5 miles in Alternatives 2, 5, and 6 and 3.1 miles in Alternative 3.

8-3: Please refer to 4-8.

8-4: We appreciate calling our attention to the *Person et al to Pendelton* letter. This letter helped us to have a better understanding of the wolf assessment model. We have corrected the error you noted in the DEIS analysis and used several points highlighted in the letter in the FEIS analysis, including use of 100 deer/square mile as a maximum habitat capability value. See FEIS Issue 3: Alexander Archipelago wolf.

8-5: We have noted your concern in the FEIS. We did modify the HSI value for older clearcuts for moose but did not modify it for deer. The available data on winter deer use of the respective stands are mostly unavailable. Field observations indicate that many second growth stands over 25 years of age still have abundant understory. Unlike younger clearcuts, these stands are beginning to develop overstory canopies that have the ability to intercept snow. Consequently, it is possible that these stands will be of greater habitat value than young, open clearcuts during deep snow conditions. Forage studies have indicated that plants that grow under the forest are more nutritious for deer than plants that grow in the open sunlight (Hanley et al. 1989).

8-6: See response 2-2.

The Forest Plan has eliminated delineation of timber stands by volume class since these delineations were not statistically different by volume per acre in three of the four volume classes. There are also problems with identifying these stands using aerial photography or obtaining statistically sound field data. Therefore, the Forest Plan directs the use of three volume strata (high, medium, and low). Because of this, the GIS layer is not sufficiently accurate to identify stands that exceed 50,000 board feet (the old criteria for volume class 7). A few of these stands may exist throughout the project area, especially in the Point Agassiz Peninsula area and within Riparian Management Areas.

Unit 15 would have an approximately 20-acre unlogged control. The unlogged control would be located in the south half of the unit, rather than along Road 6252 where past personal-use timber and firewood cutting has taken place.

## MEMORANDUM

RECEIVED

State of Alaska

DEC 29 1997 Department of Environmental Conservation

## Tongass N.F.

TO: Jennifer Garland  
Project Review Coordinator  
OMB - DGC

DATE: December 16, 1997

FILE NO: AK9711-03JJ

THRU:

TELEPHONE NO: 465-5364

FROM: Kevin J. Hanley *KJH*  
Environmental Specialist  
Division of Air and Water Quality


SUBJECT: Crystal Creek Timber Sale DEIS

9-1 The Department of Environmental Conservation has reviewed the Draft Environmental Impact Statement (DEIS) for the U.S. Forest Service's proposed Crystal Creek Timber Sale. Specifically, this sale proposes to harvest between 14 and 18 MMBF of timber from approximately 1,014 to 1,799 acres, and to construct between 16 and 23 miles of permanent and temporary road, depending on alternative. In addition, the existing log transfer facility at Thomas Bay will be reconstructed for use during this project. The modifications to this facility will undergo a separate Alaska Coastal Management Program (ACMP) consistency review, and will be subject to an ADEC Certificate of Reasonable Assurance (401 Certification). We offer the following comments pursuant to 6 AAC 50 of the ACMP and Section 319 of the Clean Water Act:

9-2 Overall, we appreciated the concise format of the DEIS and the non-technical manner in which the information was presented. In particular, we were very pleased to see the site-specific stream crossing structure information that was included in the road cards in Appendix B. While we realize that the sizes and types of the proposed crossing structures are preliminary, and will ultimately depend on cost and other factors considered during final road layout, this type of information is extremely useful in that it provides an indication of the channel characteristics at the crossing sites, including stream width, gradient, incision depth, substrate, and the type of fish habitat present.

9-3 However, although the DEIS (page 3-101) states that "*Bridges will be considered for stream crossings when culverts cannot maintain acceptable fish passage,*" according to the cards for Roads 44920 and 44990, three 60-inch culverts are proposed for installation in Class II streams where the gradient exceeds 10 percent at the crossing sites. Specifically, these sites occur at Milepost 2.8 on the 44920 Road, and at Mileposts 0.65 and 1.0 on the 44990 Road. As these structures would be incapable of providing upstream fish passage, their installation would be inconsistent with AS 16.05.840 (the Fishway Act). Consequently, bridges, rather than culverts, must be installed at these locations to ensure that fish passage is maintained. We contacted Bruce Sims (IDT Leader) regarding this issue, and he agreed that temporary bridges should be used in lieu of the proposed culverts.

Therefore, pursuant to 6 AAC 50 of the Alaska Coastal Management Program, the department agrees that this project is consistent provided the following alternative measure is employed during project implementation:

- 
- Temporary bridges, rather than culverts, shall be installed for the Class II stream crossings at MP 2.8 of the 44920 Road and at MPs 0.65 and 1.0 of the 44990 Road.

As indicated above, this alternative measure is necessary to ensure the continued free and uninterrupted passage of resident fish at these stream crossing locations, and to comply with AS 16.05.840 (the Fishway Act).

We are able to concur with the Forest Service's consistency determination for this timber sale based in, large part, on the close coordination that was provided by the Interdisciplinary Team Leader during project planning, and on the fact that all of the new roads constructed for this project will be effectively closed consistent with the standards of 11 AAC 95.320 upon completion of timber sale activities. In addition, the proposed full implementation of the TLMP process group standards and guidelines (RIP2, III, F) along all Class I, II, and III streams within the project area provides reasonable assurance that yarding will be carried out consistent with the standards of 11 AAC 95.360(a).

We appreciate the opportunity to comment.

cc: Jim Ferguson, ADEC  
Deena Henkins, ADEC  
Jack Gustafson, ADF&G  
Tom Paul, ADF&G  
Lana Shea Flanders, ADF&G  
Bill Ryan, USEPA  
Carol Hale, USF&WS, Juneau  
Bruce Sims, USFS, Petersburg  
Patty Grantham, USFS, Petersburg



## **Forest Service Responses to the Alaska Department of Environmental Conservation**

- 9-1: Please refer to response 7-1.
- 9-2: Thank you.
- 9-3: Please refer to response 7-2.

# NARROWS CONSERVATION COALITION

Post Office Box 2130  
Petersburg, Alaska 99833  
Phone/Fax: 907-772-2211

December 23, 1997

USDA Forest Service, Stikine Area  
P.O. Box 309  
Petersburg, Alaska 99833

Attn: Patricia Grantham, Acting Forest Supervisor, Stikine Area

Re: Comments on Crystal Creek Timber Harvest DEIS

Dear Ms Grantham:

Narrows Conservation Coalition (NCC) is a grassroots community based organization interested in preserving the ecological and economic integrity of our community and region in Southeast Alaska. Our members come from many walks of life and represent many varied interests in the community. We are united in our concern for the welfare of the Tongass National Forest and our way of life. Our group has been involved in the planning for this project since its first announcement, and have participated to the fullest extent possible with the U. S. Forest Service, attending meetings, discussion groups and community open houses where our members have expressed their opinions.

We wish to submit the following comments on the DEIS for the proposed Crystal Creek Timber Harvest. Numbers in parenthesis refer to the page/paragraph in the DEIS:

## STANDARDS & GUIDELINES OF THE NEW TONGASS LAND MANAGEMENT PLAN:

10-12 We have looked forward with interest to the first sale in our area proposed under the new TLMP. The new plan has many things to recommend it over the older plan - and many shortcomings as well. From what we can see in the resulting range of alternatives in this sale however, we do not find many things to cheer about. The Forest Service seems unable to perceive or to grasp the new range of options available to it to manage the forest as true stewards in the interests of all the multiple uses and users of the forest. This comes at a time of great change and adjustment on the Tongass, with its consequent opportunity for the Forest Service to take the lead in pioneering a new methodology for forest management and stewardship on the Tongass. Disappointingly, the Forest Service seems hidebound in its complacency and adherence to the status quo.

10-16 This means in practical terms that the large timber interests will come rushing in to fill the vacuum and the resulting pressures on the Forest Service from that sector of the industry will be as bad or worse than before. We are saddened that the Forest Service can not seem to see beyond the next tree to be cut and may allow this wonderful opportunity to effect meaningful change to slip away. The Crystal Creek sale seems predicated solely on a timber target volume and the limited range of alternatives bears this fact out abundantly. All the factors driving the

| Stikine Area |          |     |      |
|--------------|----------|-----|------|
| DEC 29 '97   |          |     |      |
|              | INFO     | ACT | DATE |
| FS           |          |     |      |
| AO           |          |     |      |
| E&A          |          |     |      |
| P&C          |          |     |      |
| GL           |          |     |      |
| Res          |          |     |      |
| PRC          |          |     |      |
| WRD          |          |     |      |
| File         |          |     |      |
| ✓            | B. Simon |     |      |
|              |          |     |      |
|              |          |     |      |
|              |          |     |      |

10-1b

various ranges of alternatives seem artificially contrived and subordinated to this fact. That the sale can be constructed and apparently justified under the new TLMP calls into question the bonifides of that document. We have taken issue with many of the provisions of the 1997 TLMP elsewhere and perhaps should not go into that issue here, however, we feel compelled to comment that the proposed Crystal Creek sale is disappointing, and seemingly does not offer adequate safeguards for the forest, whatever the reason.

10-2a

PURPOSE AND NEED/BACKGROUND(1-2):

The Forest Service states that it attempts to "provide a timber supply from the Tongass for sustained employment in the local wood products industry..." (emphasis added). Our concern is that the actual timber volume target goes far beyond local needs, and should be scaled to those needs with emphasis added to support the truly local timber industry, including a strong effort by the FS to cultivate value-added processing to the supply of timber made available. We view the effort to promote value-added processing as part of the responsibility and mission of the FS as custodians of a public resource. This issue receives lip service only from the Forest Service, leaving the actual job undone.

10-2b

10-3

PROJECT IMPLEMENTATION AND SCHEDULING (1-5):

We note that the FS shows the sale as one sale, leaving itself the option to break the sale down into smaller increments. In view of the goal of encouraging the local timber industry and local economies we suggest this sale be dedicated to small contractors, leaving the path open to larger, outside-the-area contractors on a default basis, on each individual offering.

10-4

CULTURAL RESOURCES (2-3), (2-9), 2-12, 3-102,103):

We are very concerned that the methodology of handling future, currently undiscovered cultural sites is not conducive to the protection of those potential sites. We can identify no mechanism other than depending on the honesty and integrity of outside contractors to identify, notify of and to protect those sites. While not disparaging any particular contractor, experience has shown this approach to be very risky - i.e., there is a history of sites being destroyed or covered over - indeed the same sorts of things have occurred in regard to nests and dens and other evidence of threatened and endangered species. There is no encouragement or motivation for the contractor to make the needed notification, and indeed, every reason for him to cover or obliterate any site discovered in order to avoid delays.

This sale encompasses a great many areas of human use from the ancient past, near past and present. Archeological investigation has already documented many of these sites. However, we are concerned that many additional sites have not yet been located or identified and these additional, as yet unlocated sites are in danger of destruction or disruption.

As custodians of the forest, the FS must develop and implement a workable and foolproof method to give needed protections to sites discovered in the future. We recognize that this applies to the Tongass as a whole and should be addressed in the TLMP, nonetheless this does not relieve the FS from the responsibility to insure the appropriate protections in this particular sale.

ALTERNATIVES (2-1):

0-5 We regard the range of alternatives being considered in the DEIS as inadequate and that they do not address the needs and conditions of the timber industry as it exists today in our area. For example, the sales alternatives do not reserve any timber volume for small operators and seemingly allow the FS the right to sell this volume to anyone they select, regardless of local conditions. This means in practice, that very conceivably the sale might go to someone outside our area and contribute very little to the local economy. This is totally and completely unacceptable. See our suggestions in our summary comments.

The (lack of) range of alternatives from a timber volume perspective suggest that they (the alternatives) are target driven, rather than providing a real and meaningful range. We view this as an abdication of the Forest Service's responsibility to provide a real and meaningful range of alternatives which take into account all the multiple uses of the Tongass National Forest - not just the timber industry, as the Forest Service perceives it.

0-6  
0-6b We also feel that undue emphasis is being placed on the moose management issue in the range of alternatives, particularly as regarding habitat capability "with thinning." As a practical matter we recognize that the FS will most likely not have the funds for thinning, if history is any indication. The "without thinning" scenario shows only a 3% difference in the range of alternatives and 4% range "with thinning", either of which translates into a difference of less than one moose harvested annually, regardless of alternative. Table 2-1 (2-6), with its footnotes indicates problems with moose habitat whatever the alternative, in any event. In all the current action alternatives, habitat capability for other species goes down, or is unchanged, as far as can be determined from your tables (2-6), (2-7).

0-7 Further, it appears that your comparison of effects on wildlife of the action alternatives is somewhat misleading, and skewed toward the moose issue in that you do not adequately address the actual effects on goats, furbearers (?!), other wildlife, salmon and finfish, etc. (2-8). We view all the current action alternatives as having a deleterious effect on subsistence use of wildlife resources. Also, we view with alarm a portion of the mitigation measures proposed, i.e., "if harvest of any of the above wildlife populations appear to be excessive, work with Alaska Department of Fish and Game to determine if changes are needed in....hunting regulations." We translate this to mean a perceived potential loss of subsistence use of the resource(s) (2-12). This is unacceptable for an area so heavily used and depended upon for subsistence and recreational hunting and so important to our local needs.

SILVICULTURAL SYSTEMS (3-3):

0-9 Documented experience on other forests in our nation has demonstrated that even-aged (clearcutting) management is detrimental to the forests and the areas' ecology and long-term economy. The excuse used for recommending this method of management on the Tongass National Forest is that there is not enough data to support that conclusion on the Tongass. Notwithstanding arguments to the contrary, it would appear that a wise and prudent custodian of the forest would take experiences from other forests under consideration, and err on the side of conservatism, conservation and common sense. That could be defined as proper stewardship.



Further, our reading of the new Standards and Guidelines for timber sale preparation (TLM 114, para III,3 - page 4-96) show that the timber prescriptions for clearcutting for this sale do not meet the requirements in the Chief's directive (June 4, 1992) on ecosystem management units, and consequently even-aged management (clearcutting) can not be considered for this sale.

10-9 Further, clearcutting in order to provide for optimum yields from the forest and for biological integrity, requires thinning, at intervals of a few years, with its consequent expense. History shows that thinning does not happen over a large percentage of the clearcuts, primarily for budgetary reasons, so most advantages of clearcutting are lost. Your comments in the DEIS about future thinning bear this out - and we think are misleading in view of the history of thinning on the Tongass National Forest. The main advantage accrues to the fortunate contractor who gets in on the original clearcutting, as subsidized by the taxpayer in the form of sweet deals and road credits. This is a betrayal of the public trust and a very poor example of "Collaborative Stewardship". This must cease. A **clearly defined thinning goal** which addresses **all second growth** in the area of this sale must and should be required.

10-10 It is our fundamental belief that a clearcutting management policy is wrong. It has been proven wrong and short sighted in other places, is very detrimental to forests, the ecology and ultimately to area economies. The sooner this fact is recognized and factored into the planning process, the sooner the U. S. Forest Service can get on with its mandate to **properly manage the forests for all their multiple uses**. We see this as the real goal of "Collaborative Stewardship."

#### SECOND GROWTH MANAGEMENT (3-13):

We believe that it is time for the Forest Service to become involved in the process of producing usable fiber, at a profit, from second growth management on the Tongass National Forest. Pioneer projects in other areas have demonstrated the feasibility of this idea. Some second growth stands on the Tongass are now reaching the point of providing marketable timber while many others have potential for producing usable material during the thinning process. In the interests of the forest, and of local area economies, the Forest Service must assist and encourage the pioneering efforts.

#### TIMBER DEMAND (3-13):

10-11a The Forest Service's assessment of timber demand is fundamentally flawed. You suggest that although the closure of the two pulp mills in Southeast Alaska has lowered the "pulp wood demand," sawlog demand has not been similarly affected. This totally ignores the fact that a great deal of potential sawlog timber was diverted to pulp production in the past - the mills were there, the fiber was there, and cheap - thanks to the policies of the U.S. Forest Service's timber program, so many fine sawlogs were pulped to satisfy the appetite of the mills - a known and undisputed fact. The mills are now closed and this artificial demand no longer exists. We feel that it is high time that the Forest Service get out of the "timber business" wherein all else is subordinated to some arcane timber volume target and "market demand" figure, derived after a great deal of public expense, on some esoteric and unfathomable hidden and unexplainable proprietary process known only to yourselves. It certainly does not make sense to anyone else.

10-11b We must note that some recent timber sales have received no bids (Rodman Bay, Northwest Baranof Island for example). Also noted is that the FS states in the Indian River DEIS that there

10-11 are currently 504 mmbf of uncut timber volume, under contract to the industry on the Tongass National Forest.

HIGHGRADING AND PROPORTIONALITY:

10-12 We view with alarm the amount of volume Class 6 and above targeted in all alternatives for this sale. Your tables in the summary on page vi in the DEIS give a vivid picture and reason for our alarm. The Forest Service's approach appears to subvert congressional intent and uses the very poor excuse that proportionality only relates to long-term contracts. This is a further abnegation of your responsibilities as stewards of the public forest and must be remedied.

FOREST SERVICE COSTS (3-14):

10-13 We appreciate the FS' efforts to assess and contain costs. However, we feel that you are looking at the wrong end of the horse when you complain about the costs of preparing timber sales - and give as the reason the alternatives-to-clearcutting silvicultural methods for sales. It seems to us that you would look instead towards the savings to be realized through reducing or eliminating road credits, road maintenance costs, thinning costs, negative sale costs, environmental damage mitigation measures and the myriad other costs associated with clearcutting.

Certainly we recognize that it is more expensive to monitor and control sales of scattered trees, and groups of trees instead of large clearcuts. Nonetheless, we view it as part of your custodial responsibility, and your mandate from the public to properly manage the forest in your charge. This includes, in our view, a thorough assessment of any sale, with heavy emphasis on the health, sustainability and true multiple use of the forest. Taken to a pragmatic, logical end such an assessment will indicate that clearcutting is an improper management tool and must be replaced by other means of harvest such as group selection, individual tree selection, non-logging, etc.

LOGGING OPERABILITY (3-15):

10-14 The FS argument about the expense of logging operations on anything other than clearcuts is further evidence that the Crystal Creek Sale should be broken into smaller fragments that can be effectively logged from the existing road system by small local contractors. We neither need nor desire for large operators to come into our area, with imported labor, and imported sub-contractors to clearcut a public resource at the public expense. Better to husband that resource and encourage and support the local contractors and a viable value-added infrastructure.

10-15 Once again we urge the Forest Service to put effort and resources into the development of value added processing of the timber on the Tongass National Forest to provide more economic benefit per tree felled. We think this should be the number one priority of your timber industry focus.

ECONOMIC COMPARISON OF ALTERNATIVES (3-16):

10-16 The above several paragraphs make our argument and reinforce our judgment about the type(s) of sales that should be offered. It appears that of the alternatives suggested by the Forest Service, Alternative 5 seems least damaging (mostly because ~~of~~ it calls for the least amount of new roading), except from the viewpoint of how much old growth and volume Class 6 and above is targeted and the detrimental effects for wildlife and habitat. By modifying Alternative 5 to

10-16 meet the criteria suggested above (and in the following paragraph), it would become more acceptable to NCC - however, we then could not justify this sale based on the amount of volume remaining after all the protections are in place.

10-17 A reading of your "Issue 3 Biodiversity" table on page vi-Summary gives a very chilling view of the amount of volume class 6+ left, whether harvest is permitted or not. This causes us to question whether planning a timber sale in the Crystal Creek area is **even a proper and prudent management strategy at all**. Please refer to our summary.

AGING FACTORS FOR SECOND GROWTH:

We are always concerned about the cumulative effects of logging new clearcuts adjacent to older clearcuts, the aggregate which would be in excess of the 100 acre maximum suggested in the new TLMP. We recognize that the TLMP no longer considers a area clearcut after it has obtained new growth of five feet or more in height (TLMP Standards & Guidelines, paragraph TLM 114, IV,F - page 4-97, Forest Plan), however, as a practical matter any sane person still considers such an area clearcut, i.e., if the growth is as low as five feet in height - or even fifteen or twenty feet for that matter. We're also sure that wildlife can also discern a difference, and there is in fact a measurable difference to the ecology of the area.

10-18 We can not presently determine from current information given in a DEIS the age of the existing clearcuts in the sale area, so it is very difficult to make an exact assessment without visiting each unit on the ground. We consider this an important factor in evaluating potential nearby timber sales. Perhaps providing the age of the clearcuts and average height of the new growth in existing adjacent managed stands would be pertinent information in any EIS document. Accordingly, we hereby request that this information be furnished with any proposed sale in the future, as standard operating procedure, and included as a requirement in the TLMP Standards & Guidelines.

Our specific areas of concern in this sale are as follows:

Alternative 2 (Figure 2-2): Units 15, 26

Alternative 3 (Figure 2-3): Units 13, 17, 35, 47, 48, 49, 53, 65, 73

Alternative 4 (Figure 2-4): Units 15, 26, 49

Alternative 5 (Figure 2-5): Units 5, 15, 22, 47, 48, 87

OPPORTUNITIES FOR OFFERING SMALL SALES (3-17):

10-19 By using the FS definition of a small sale and restricting the sale to small operators, modifying the silvicultural method away from clearcutting and the targeting of Class 6 and above old growth, restricting new roading, insuring proper protections for fish and wildlife habitat, and mitigating landslide dangers and other soil and sedimentation problems, this type of sale could become the model that the conservation community could embrace and support. We are pleased to at least see these ideas discussed in a DEIS. even though not included or adequately represented in any action alternative.



SUBSISTENCE USE AND CUMULATIVE EFFECTS OF HARVESTS (Chapter 3):

10-20 We are concerned anytime it becomes evident that there will be an effect on population levels of animals used for subsistence - and this sale is no different from others in that it will have a detrimental effect, except possibly for moose, according to the FS. Further, it appears that there may be an undefined detrimental effect on mountain goat due to the roading proposed in certain of the alternatives, and the proximity of the harvest units to either goat kidding areas or summer range areas. Many units are also within or very near goose nesting and breeding areas and waterfowl buffers. We urge extreme caution and care in the design of any sale which may potentially effect any subsistence use. Again we say this is unacceptable for an area so heavily used and depended upon for subsistence and recreational hunting and so important to our local needs.

0-21 There has already been a very heavy effect felt on wildlife due to past harvests. (We note that you state that prior to 1978 nearly 160 million board feet of timber passed over the existing log bulkhead at the Thomas Bay LTF, and since then less than 1 million feet [3-90]). We worry that the cumulative effects of the proposed new harvests, and most particularly the clearcutting planned, will adversely affect the overall health of wildlife populations - even moose in due time, for you can not continue to target moose winter habitat without sooner or later suffering the consequences - and this is further borne out by your tables on pages (v) and (vi) of your summary.

RECREATION (3-77):

0-23 As recognized by the FS, the Thomas Bay and Crystal Creek drainage are very heavily used for recreation and hunting by residents of Southeast Alaska, particularly by residents of Petersburg. Clearcutting and recreation are not a happy mix, and for this reason if for no other potential timber harvests in this area should be limited to group selection and individual tree selection.

0-24 In its assessment of the scenic opportunities for the Tongass National Forest the FS gives very little or no weight to aerial viewing. A great many residents and visitors to the forest obtain most of their impressions from the air and to be blunt, a clearcut is an abomination to the view - even "clearcuts with reserves." Single tree and group selection go a long way towards mitigating the viewshed degradation whatever the vantage point, another strong argument for this method of silviculture.

SENSITIVE WILDLIFE (3-104):

0-25 We are concerned about the potential effect on sensitive wildlife that the alternatives will have. In particular, we worry about the Marbled Murrelet, Osprey, Spotted Frog and Queen Charlotte Goshawk, as well as any sensitive plant species. It appears that location and identification of potentially sensitive, threatened and endangered species is uncertain and imprecise. While we may be fortunate on the Tongass to have a seeming abundance of essential habitat, the loss of any to harvest activities is a withdrawal from a bank of very finite resources. Mitigation measures proposed seem hit-or-miss and appear to be addressed to dealing with a problem after the fact. We recognize that the FS can not possibly be expected to identify and protect against every conceivable instance of harm, however, we believe that it is always in the forest's best interest to err on the side of caution and conservation. Consequently, we urge you to eliminate any cutting units which have even the remotest possible detrimental effect on sensitive wildlife.



TRANSPORTATION ISSUES (3-88, 3-89):

Applying some budgetary figures to your table 3-35 (including bridging and culverts), we come up with the following approximate costs (changes) for roading for the various alternatives:

|                |      |                 |
|----------------|------|-----------------|
| Alternative #1 |      | 0               |
| Alternative #2 | Plus | \$2.883 million |
| Alternative #3 | Plus | \$2.606 million |
| Alternative #4 | Plus | \$3.179 million |
| Alternative #5 | Plus | \$1.712 million |

10-26a A fair percentage of these costs are for temporary roads to be used only once, and the estimates do not include costs for closing of roads after harvests, mitigation of damages due to roading, monitoring, or road maintenance. You also show the various alternatives to this sale as generating negative income to the U. S. Treasury - though you attempt to explain this away by saying recent sales have gone for multiples of pre-sale estimates. This certainly can not be depended upon in light of recent market conditions and response to FS offerings. Once again, we must question the wisdom of a sale which (even in the planning process) **consumes an irreplaceable resource and generates a net loss** to the treasury. Perhaps this is strictly a political issue and therefore not subject to any reality check, but it certainly does not make the least sense to us as members of the taxpaying public.

SOILS AND HYDROLOGY (3-90):

10-27 The various unit cards and your tables 3-36 and 3-37 show a very high percentage of planned activity on unstable, landslide prone terrain - 50% with a potential landslide hazard rating ranging from moderate through extreme. We must question the wisdom of this sort of planning from a common sense point of view. Helicopter logging may make sense from a roading standpoint (we might argue that too!), but in our view it simply allows you to clearcut from unsuitable and unstable hydrological slopes and soils - and the public forest will pay the price later.

ROAD SEDIMENTS (3-101): The FS' statement about the compromising of the timing clauses for instream activities on the Road Cards raises an alarm signal. This translates into a compromise of stream protections and fish spawning and rearing habitat. It appears that instream activities will be permitted for at least part of the migration period for coho, pink, chum salmon, and steelhead.

10-28 From the DEIS: "Erosion and increased Sedimentation. Erosion may occur as a result of road construction, heavy equipment use, and log yarding." (3-110). The assumption (and FS statement) that the "...risk of sedimentation as a result of harvest activities is generally low because of logging slash covering the soil surface and rapid regrowth of vegetation." makes one wonder if sites are ever actually visited by FS personnel during rainfall, after logging and roading activities have occurred. Non-profession, empirical observations, even years after "development" activities have occurred, tell another story to those who trouble to look.

Further, your statement that "Changes in stream flows...may result in some erosion, channel adjustment, and sedimentation." (3-113) reinforce our reasons for alarm.

The 1997 TLMP mandates as follows:

RIP1,II, A, 9 (4-53, TLMP S&G); "Design and coordinate road management activities to provide for the needs of wildlife. . ." and;

RIP2, II, F, 5 (4-55, TLMP S&G); "In locating and designing timber harvest activities, require **special consideration and mitigation** (emphasis added) to ensure that Riparian Management Area characteristics for fish and wildlife habitat, water quality, and other riparian-associated resources are maintained" and;

0-28 RIP2,II,F, 6 (4-55, TLMP S&G); "Provide protection to fish and wildlife during critical periods of their life cycles by applying seasonal restrictions on timber harvest and road use activities, to the extent feasible";

TRAN 214, II, 6 (4-106, TLMP S&G); "Meet fish passage direction at locations where roads cross fish streams....Specify permissible uses of heavy machinery and the timing of road construction activities in contracts based on consultation with the Alaska Department of Fish and Game and as determined by interdisciplinary analysis and on approval by the appropriate line officer."

The foregoing prescriptions do not allow for compromise; the appropriate protections **must be insured** and we do not see those protections in this DEIS. Consequently the DEIS for the proposed Crystal Creek Harvest **is not in compliance with the new TLMP.**

10-29 Furthermore, the new TLMP Standards and Guidelines (Appendix J, Page J-1,2) require that "Watershed analysis must be completed for any project decision that incorporates site-specific adjustment of process group standards & guidelines as provided for in the Riparian Forest-wide Standards and Guidelines." (Paragraph B), and "...A more intensive, complex, and field-based watershed analysis will be needed in watersheds with, but not limited to: ...5. More than 20% of the watershed acres with trees in second growth younger than 30 years." (Paragraph C...5).

UNIT CARDS (B-8 thru B-161):

In assessing the unit cards for this sale we have used the following parameters:

- 0-30
- a. What effect the unit has for wildlife concerns and subsistence impacts;
  - b. What effect the unit has on fisheries;
  - c. What is the roading/bridging effect for the unit;
  - d. What soil, slope and landslide concerns do have for the unit;
  - e. What stream crossings/proximity's does the unit have;
  - f. What scenery concerns do we have for the unit;
  - g. What the harvest of the unit adds to the cumulative degradation of the ecosystem and environment;
  - h. Whether and how much the unit's harvest impacts wildlife buffers, feeding or breeding areas;
  - i. What kind of harvest is planned for the unit - i.e., Clearcut, Group Selection or Single-tree selection.

10-30 Because of the many concerns and mitigating factors for this sale as now planned, we find that we can fully support only the harvest of Unit #44 as in Alternative 2 and Units #64 and #67 in Alternative 4. The foregoing leads us to the conclusion that this sale is not satisfactory in any of the action alternatives as now planned, is not consistent with the Standards and Guidelines of the new Tongass Land Management Plan and should be terminated.

10-31 US FISH AND WILDLIFE SERVICE AND NATIONAL MARINE FISHERIES SERVICE (1-17):

The DEIS states that "Biological Assessments which assess the status and project impacts on the wildlife species of concern, have been reviewed and approved by both agencies." We would ask that the US Forest Service furnish documentation in the FEIS, from the appropriate agencies to validate this statement in light of recent experiences where the FS has miss-stated such approval. Further, the same documentation showing approvals should be included for the Alaska Department of Environmental Conservation, the United States Environmental Protection Agency and the Alaska Department of Fish and Game.

This is a very real and egregious problem in implementing the forest plan and permits an extreme and unacceptable degree of danger to the forest and the area ecology. We are currently addressing this issue elsewhere but feel strongly that it must be specifically spelled out for this sale in the absence of a current solution to the problem. See the following documents regarding another recent sale which demonstrate the reasons for our concern and alarm:

- 10-32
- Exhibit "A" - Copy of letter from EPA dated 11/25/97 - Describes unmitigated concerns from an earlier sale;
  - Exhibit "B" - Copy of Fax from Alaska DEC dated 11/13/97 - Describes Forest Service attitudes about other agency concerns for an earlier sale;
  - Exhibit "C" - Copy of letter from Alaska DEC dated 11/29/97 - Describes unmitigated concerns for an earlier sale;
  - Exhibit "D" - Copy of letter from Alaska Dept. of Fish & Game dated 12/17/97 - Describes unmitigated concerns for an earlier sale;
  - Exhibit "E" - Copy of NCC Press Release dated 12/15/97 - contains verbatim quotes from Forest Service officials in conflict with the facts about other agency concerns.

**This is a very serious problem.** Currently, there is no fail-safe mechanism to guarantee that all legislated, regulated or recommended mitigation measures are provided for in a particular sale and the Forest Service **must remedy** this oversight. That this is not prescribed in the new Tongass Land Management Plan does not relieve the Forest Service from the responsibility to provide the protections in this project.

We appreciate the opportunity to comment on this proposed sale. We earnestly hope that the Forest Service will take into account our many concerns and adjust any sale accordingly. We also hope that the Forest Service will avail itself of this wonderful opportunity in this watershed of change on the forest, to adjust and advance the level of protection of the forest to meet all the many needs of its dwellers and users. To do otherwise is a failure to meet the requirements of the stated mission of the United States Forest Service.

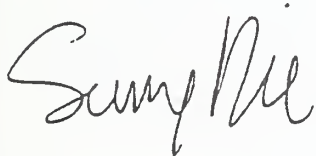


### SUMMARY

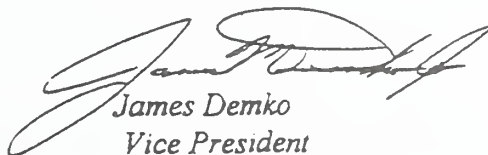
In our opinion, a new resource management plan is needed for any potential Crystal Creek Timber Sale, which optimally should be predicated on fresh and innovative alternative(s) which provide the following:

- 10-33
- a. Small individual sales of 1mmbf or less, manageable by our local contractors, i.e., such as those shown as "opportunities for Small Sales - 7.5mmbf" (2-6);
  - b. Sales which require little or no roadbuilding - and consequently no road mitigation or maintenance costs into the future - and no "irretrievable, irreversible" loss of productive forest land to roads - this might rule out any sale in the Crystal Creek area, in fact;
  - c. Sales which target no volume class 6 or higher - this means in turn, that the total volumes considered would be considerably less, - attractive resource conservation and old growth habitat protection considerations;
  - d. Sales which might target some of the older second growth now reaching marketable size and in need of thinning - also a resource conservation and enhancement approach;
  - e. A FS approach which actively recruits and encourages value-added processing to the timber supply from this particular sale, or any future sale. (Note: we read this as a **requirement** of the Standards and Guidelines in the new TLMP (TIM 114, para IX, A, 1 - page 4-99).
  - f. Sales which provide full protections, without compromise, for the following:
    1. Fisheries;
    2. Wildlife and wildlife habitat;
    3. Subsistence usage of all resources;
    4. Wetlands;
    5. Soils;
    6. Lakes, stream & rivers;
    7. Ecological integrity for the area as a whole.

for  
NARROWS CONSERVATION COALITION:



Sunny Rice  
President



James Demko  
Vice President



Eric Lee  
Secretary



Erik Lie-Nielsen  
Spokesman



## Forest Response to the Narrows Conservation Coalition

- 10-1a: We explored many innovative land management options. Some of the ideas that we have included as part of implementing the 1997 Forest Plan are:
- ♦ using group selection, single-tree selection harvest, gap phase dynamics, and clearcuts with reserve trees rather than traditional clearcutting,
  - ♦ buffering waterfowl areas and heron nest sites,
  - ♦ construction of a recreation shelter and trail at Ess Lake,
  - ♦ enhancement of a wetland,
  - ♦ revetment of the bank of the Muddy River to protect loss of a wetland,
  - ♦ use of bridges that can be removed and reused instead of culverts,
  - ♦ evaluation and prescription of treatment of second growth to maintain and improve wildlife forage, and
  - ♦ coordination with the U.S. Fish and Wildlife Service and the Alaska Department of Fish and Game to modify OGRs to emphasize high volume habitat and maintain old-growth habitat connectivity.
- 10-1b: Many “safeguards” have been designed into both the Forest Plan and the Crystal Creek Timber Harvest EIS. Please refer to response 3-1b and 3-6a.
- 10-2a: The Tongass National Forest is managed for the benefit of all Americans and the sustained yield is calculated for the National Forest as a whole and not piecemeal. Several operators within the Stikine Area or elsewhere in Southeast Alaska could purchase and utilize the volume projected for harvest. One scoping comment from a local operator requested the amount of 16 mmbf.
- The actual size and scheduling of sales will be done after the Record of Decision is signed based on the amount of volume, if any, from the decision and the market at that time. Currently, the timber volume would be offered in two years, 1999 and 2003. These offerings likely will include several small sales.
- 10-2b: The Forest Service strives to supply timber to operators on an even flow sustained yield basis to enable purchasers to make sound business decisions based on this supply. This is reflected in the ten-year sale schedule. The research branch of the Forest Service conducts studies to explore manufacturing options. The Forest Service does not enter into competition with private operators.
- See response to 3-3 and 10-15.
- 10-3: The timber is planned to be sold as part of the Small Business Administration set-aside volume. The size and scheduling of the timber sales will be determined after the Record of Decision is signed and will be based on several factors, one of which is the need of local operators. Another consideration is to make the sales viable economic business ventures. The amount of volume needed to cover the costs to develop the transportation system including the reconstruction of the log transfer facility must be considered.
- 10-4: Professional archaeologists thoroughly surveyed all high site density areas and selected low site density areas that will be directly impacted by the proposed project. An additional survey was conducted in high site density areas outside direct impact. The public was also encouraged to identify known cultural resources during the planning process.
- During harvest and road building activities, Forest Service sale administrators and road inspectors will be on-site monitoring the contractor's activities. This monitoring will ensure that all aspects of the sale are carried out as planned including all Forest Plan Standards and Guidelines. The contractor is bound by contractual agreement to protect any new cultural resource discoveries. To knowingly destroy a cultural resource site on federal land is a violation of federal laws and the operator would be subject to prosecution. Forest Service personnel involved with post-planning activities have received training to recognize the most common types of cultural resources such as shell middens and culturally modified trees.
- We will conduct validation monitoring of all ground disturbance along reconstructed and newly constructed roads. This monitoring will reveal if any new sites are found and validate the assumptions of the cultural resource probability model.

10-5: Please refer to response 3-1a.

The U. S. Forest Service, Alaska Region and the Small Business Administration (SBA) agreed in the Forest Plan (page 3-291) that all independent sales will be SBA sales with a goal of 100 MMBF per Fiscal Year until the year 2000. This agreement is reviewed on a yearly basis. In December 1997, a revised agreement was completed. The new agreement states that the SBA share will be 124 MMBF. According to the ten year sale schedule, the timber volume for the Crystal Creek Timber Harvest Area will be advertised as small business set-aside volume. The actual size of the sales will be determined in the year that the timber is sold.

Please refer to comment 10-3.

10-6a: See response to comment 3-10.

We continue to believe that moose management is an important concern within the study area and that future silviculture will affect the population. Alaska Department of Fish and Game has expressed concerns about moose habitat management within the study area to the Forest Service as far back as 1976. Many local hunters use the Thomas Bay area for moose hunting and have expressed interest in maintaining the moose population. Wildlife biologists and hunters believe that the moose population was greatly benefitted by past harvest.

10-6b: Please refer to 3-11.

10-7: We have displayed likely significant effects on wildlife species in the Chapter 3 of the FEIS using the best data and habitat models available. The management indicator species chosen were listed in the Forest Plan as those species likely to respond to land management activities. Their response can be used to predict the response of other species. Moose was included in this analysis as an important project level indicator species.

Please refer to response 3-10.

10-8: Monitoring of wildlife harvest statistics does not imply potential loss of subsistence opportunities. Wildlife harvest statistics are part of the Forest Plan monitoring and evaluation plan (page 6-15). Post-sale open road densities are low and would change little from the existing condition. If game harvests did increase in the study area to unacceptable levels in the future, further access restrictions and restrictions on nonsubsistence harvests would be management options that would protect subsistence hunting. However, there will not be a significant possibility of a significant restriction for any alternative based on this analysis.

10-9: This project is not proposing any traditional clearcutting. Clearcutting with reserves is considered two-aged management (Forest Plan FEIS, Appendix G). Group selection and single tree selection are also proposed. All proposed silvicultural methods will result in a stand that has a variety of ages and diverse vegetation structure. These silvicultural techniques are completely responsive to the Chief's direction and the Forest Plan.

10-10: All second-growth units were examined for potential thinning. See Appendix A - Activity cards.

Please refer to responses 3-11.

10-11a: The Forest Service cannot dictate what products are manufactured. Generally, a manufacturer will make the highest-value product possible. If the wood was more profitable as pulp than low-quality sawtimber, it was used that way. The Forest Plan FEIS page 3-285 states, "Decisions regarding whether a log will go to the chipper or to the saw mill will vary, depending on the market price of lumber and pulp, as well as the current available log and chip supply."

10-11b: Very few timber sales on the Tongass have not had bids submitted. It is not uncommon to have multiple bidders and for sales to sell above appraised value. Several recent timber sales on the Stikine Area have had up to four bidders and the bid price was sometimes in excess of ten times the appraised value. The 504 MMBF presently under contract includes 300 MMBF which was part of the settlement for the termination of the Ketchikan Pulp Corporation contract. Timber sale contracts generally run for at least three years. Therefore, more timber can be under contract and logged in a given year than the average annual offering amount.

Timber sales do not sell for many reasons. Often a sale that does not sell when first offered will be sell when re-offered at a later date due to the natural fluctuations of the timber market. A sale that is currently appraised negatively may be appraised positively at another time. The amount that a purchaser is willing to "stockpile" depends on the individual's workforce and money available for capital investments. In the case of Rodman-Apple Timber Sale, there would have been a two-year delay to log any of the timber due to the use of the LTF. Possible negative aspects of the part of the Northwest Baranof timber that was offered was the short contract period and/or the amount of volume. These sales will be re-offered in the future.

- 10-12: The alternatives vary in the amount of proposed harvest of volume class 6+ (FEIS, Table 3-18). Alternative 3 only proposes harvest on 11 acres of volume 6+ forest using single-tree selection out of a total of 680 acres proposed for harvest.

We are not "subverting congressional intent." The Tongass Timber Reform Act, ratified by both the U. S. House of Representatives and the Senate, specifically ties proportionality to modifications of the long-term contracts in Southeast Alaska (Sec. 301 (c)(2) Title III). The Forest Plan deleted all reference to proportionality with the termination of the long-term contracts.

See response 2-6.

- 10-13: In the DEIS, we stated that the costs of preparing timber sales does increase when methods other than clearcutting are used in order to compare the alternatives. Any time that trees need to be individually marked with paint will increase personnel-time and therefore the money involved. We support alternatives-to-clearcutting and have incorporated them in the alternatives. These methods would still incur road costs and possibly higher road maintenance costs since more entries could be needed to harvest timber. Thinning is planned in all silvicultural systems except single tree selection. Mitigation measures would probably cost the same in either case. Clearcutting is recognized as the most cost-efficient method to prepare and harvest timber (Forest Plan FEIS, Appendix C).

We do recognize that other silvicultural methods have benefits for wildlife and other resource protection. Because of these benefits, we have proposed uneven-aged management for many units in the Crystal Creek project.

- 10-14: Alternatives 2, 5, and 6 include units that could be logged from the existing road system.

Please refer to responses 10-2a and 10-5.

- 10-15: You are correct that the effort to promote value-added processing is part of the Forest Service mission. The Forest Plan, Appendix B, page B-10 states that the Forest Service will: "Study the potential influence on forest management resulting from the establishment of additional value-added forest products-processing industries in Southeast Alaska." One example of this is the technical research done by the Madison Wood Laboratory presented in a workshop sponsored by the Forest Service in Petersburg in November 1997. Value-added processing, needs an even flow of raw material to be able to plan on production.

See response 3-3 paragraph 2.

- 10-16: When designing the alternatives, the IDT tried to make trade-offs to balance multiple uses and the issues. Alternative 5 builds the least amount of new road and harvests in the smallest geographic area. In order to reduce the miles of permanent roads, a trade-off was made to include harvest of easily-accessible timber, which are the high-volume stands along the Point Agassiz road system. If we eliminated these stands, the volume would be insufficient to make an economic offering because of the costs of the reconstruction of the log transfer facility.
- 10-17: See response to 3-6a and 10-12.



- 10-18: Regarding adjacency of new harvest units to existing harvest units, the Forest Plan states that the harvested units will be considered fully stocked (for points of cumulative vegetative effects analysis) when the existing stand is "...five feet in height and free to grow..." (effectively no competition, not suppressed). The Forest Plan (p. 4-97) tiers to the Alaska Regional Guide (November 1983, page 3-22) which tiers to the National Forest Management Act (Section 219.27d(2)).
- All the proposed harvest units will meet this criteria; all existing second-growth stands adjacent to proposed units are at least fifteen feet in height. These stands are at least 20 years old except for several one acre patches within Unit 22 which were harvested in 1982. Units 17, 35, 53, 65, and 73 are not adjacent to any existing units. No opening in maximum of 100 acres would be created under any action alternative.
- 10-19: See responses 10-2 and 3.3.
- This harvest is planned to be sold as part of the Small Business set-aside volume for the years 1999 and 2003. Smaller sales may be broken out and rescheduled on the ten-year sale schedule after the Record of Decision is signed which will include what units are to be harvested, if any. The sizes of sales are determined for small businesses are determined on a yearly basis between the Small Business Association and the Forest Service based on the requests from small timber operators.
- 10-20: See responses to 2.1, 2.2, and 10.8.
- We have conducted field surveys of the areas surrounding the proposed harvest units and found that goats do not appear to summer or kid in the areas near the proposed harvest units. Proposed road location and road closures were designed to protect goats in the Crystal Creek drainage. Restrictions on helicopter overflights of these areas during logging operations will further reduce the potential for impacts (Appendix A). We do not anticipate any adverse impacts to goat summer or kidding areas in any of the alternatives.
- 10-21: See response 4-2b, paragraph 2.
- 10-22: Numerous protection measures are built into the Forest Plan including beach, estuarine, and riparian buffers; old growth reserves and undeveloped land use designations. The trend towards harvest prescriptions other than traditional clearcutting will further reduce impacts on wildlife.
- We display cumulative effects on wildlife in Chapter 3. Despite large scale clearcutting in the past, the area supports a tremendous abundance of wildlife. The Forest Service and the Alaska Department of Fish and Game are planning silvicultural treatments to areas of second-growth forest which will enhance wildlife use. We strongly believe that the area will continue to support a wide diversity of wildlife and continue to be a favored hunting and recreation area for the local residents.
- See response 3-6a and 10-9.
- 10-23: The Crystal Creek Planning Area is already characterized by roads and clearcuts and is currently used by recreationists. Not all the aspects of past clearcutting are negative with regard to recreational use. Past clearcutting increased forage which increased moose numbers and provided more hunting opportunities which has brought hunters to the area. These hunters use the existing road systems for hunting and camping. Additional proposed clearcutting with reserve units, mixed with group selection and single-tree selection units may alter the recreation experience slightly but we expect it to remain a popular recreation area. Recently, the area has become more popular for mountain biking because of its flat terrain, easy access, and few vehicles on the road.
- 10-24: Aerial viewpoints are not identified in the Forest Plan (FEIS 3-196) as areas from which scenery will be emphasized. For the purpose of scenic assessment, aerial observation is considered a non-priority viewing position and managed according to the not seen/nonpriority guidelines described for each Land Use Designation. Most flight-seeing tours are conducted over the glacier fields to the north and south. Many of the existing clearcuts are now 40 to 60 feet tall and are not visually unattractive from the air.
- 10-25: We will protect Threatened, Endangered, and Sensitive Species in accordance with the Standards and Guidelines of the Forest Plan (page 4-88 through 4-93). Established protocols were followed during surveys.



- 10-26a: The costs of closing roads are incurred by the purchaser, and most of the needed drainage work is done when the road is closed (see response 10-28). The roads that will remain open after timber harvest are those that have been open for years and require very little maintenance except for brushing, which was done in the fall of 1997.
- 10-26b: Although a timber sale may have an initial negative appraisal, it is important to note our appraisal estimates are conservative. The Forest Plan FEIS pages 3-466 through 3-469 more fully explains Forest receipts to the State and capital improvements. Costs do include closing roads following harvest operations.
- 10-27: Table 3-31 shows that 21.6% of the soils in the entire project area have a likely potential for instability and mass movement. Table 3-32 indicates how many acres of these soils are within unit boundaries. Since most of these units are planned for group selection harvest or clearcut with reserves trees using helicopter-logging, areas of unstable soils can be avoided. Several units were field reviewed by appropriate personnel between the Draft and Final EIS and were deleted from all Alternatives because of the possibility that slopes were unstable.
- See response 4-6b.
- 10-28: We have consulted with the Alaska Department of Fish and Game to determine the fish passage needs and construction windows on a stream-by-stream basis depending on fish or wildlife species present.
- The Petersburg Ranger District maintains an inventory of existing permanent roads. In the project area, we will improve existing drainage structures and close new roads which will be left in a self-maintaining condition with as little artificial concentration of water as possible. Many culverts and bridges will be pulled, and water bars will be constructed. Areas of bare soil will be revegetated. These measures combined with proper location and construction techniques should result in less road-related erosion than may have previously occurred.
- If members of the Narrows Conservation Coalition know of currently eroding sites, please give the District Soil Scientist a call so that the site can be surveyed for restoration needs.
- 10-29: Please refer to response 3-7.
- 10-30: The three units, Units 44, 64, and 67, use group selection harvest. These units have a total volume of approximately one-half million board feet. Considering the size of the project area (100 square miles), this suggestion appears conservative if balancing all multiple uses is a desired objective.
- We have considered your alternative and have decided that this is outside the reasonable range of alternatives because of amount of impact to other resources compared to the economic benefit. To log these units would require 1.6 miles of new road and a bridge across the Muddy River. The distance for helicopter logging would be over the standard operating limit. With this low amount of volume, the reconstruction of the log transfer facility would not be economically feasible. If helicopter transport of the logs into Thomas Bay would be used, it could result in an unsafe operation considering the amount of public recreation and commercial gravel operation activity in the area.
- 10-31: Biological Assessments have been reviewed and approved by U.S. Fish and Wildlife Service and the National Marine Fisheries Service. The Biological Opinions from these agencies have been received and are in the planning record.
- 10-32: Your comment and concerns are noted. Personnel from the Alaska Department of Environmental Conservation, Alaska Department of Fish and Game, U.S. Fish and Wildlife Service, and the Army Corps of Engineers have visited the project area and have been very helpful in providing constructive advice. The Alaska Division of Governmental Coordination has found the project consistent with State Coastal Zone Management, with provisions.
- 10-33: a. See comment 10-19
- b. See response to 10-16.
- c. See response to 2-2. Alternative 3 was developed to avoid areas within the highest volume stands.

- d. See response to 3-11. Harvesting second-growth at this time would force selection of trees that are merchantable with current markets and could result in high-grading.
- e. The Forest Plan Standards and Guidelines, (page 4-99 and 3-285) require wood material be promoted for its highest value product. The condition and type of wood will dictate this; some wood material may be only suitable for fuelwood. The actual use of the wood will ultimately be decided by the purchaser.
- f. All Forest Plan Standards and guidelines will be followed as stated in Chapter 1 and throughout the document.



UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL OCEAN SERVICE  
National Geodetic Survey  
Silver Spring, Maryland 20910-3282

NOV 9 1997

MEMORANDUM FOR: Susan B. Fruchter  
Acting NEPA Coordinator

FROM: Charles W. Challstrom  
Acting Director, National Geodetic Survey

SUBJECT: DEIS-9711-03--Crystal Creek Timber Harvest,  
Tongass National Forest, Stikine Area, Alaska  
Region

The subject statement has been reviewed within the areas of the National Geodetic Survey's (NGS) responsibility and expertise and in terms of the impact of the proposed actions on NGS activities and projects.

11-1 All available geodetic control information about horizontal and vertical geodetic control monuments in the subject area is contained on the NGS home page at the following Internet World Wide Web address: <http://www.ngs.noaa.gov>. After entering the NGS home page, please access the topic "Products and Services" and then access the menu item "Data Sheet." This menu item will allow you to directly access geodetic control monument information from the NGS data base for the subject area project. This information should be reviewed for identifying the location and designation of any geodetic control monuments that may be affected by the proposed project.

If there are any planned activities which will disturb or destroy these monuments, NGS requires not less than 90 days' notification in advance of such activities in order to plan for their relocation. NGS recommends that funding for this project includes the cost of any relocation(s) required.

For further information about these monuments, please contact Rick Yorczyk; SSMC3, NOAA, N/NGS; 1315 East West Highway; Silver Spring, Maryland 20910; telephone: 301-713-3230 x142; fax: 301-713-4175.

Monuments map checked by Sam Bunge  
on 1-5-98. None will be disturbed.

P. Simon



## **Forest Response to the National Oceanic and Atmospheric Administration**

11-1: Thank you. We double-checked and found that no geodetic control monuments will be affected by the project.



**FOREST SERVICE EMPLOYEES FOR ENVIRONMENTAL ETHICS**  
**P.O. BOX 11615**  
**EUGENE, OR 97440**  
**(541) 484-2692**

**RECEIVED**

January 2, 1998

Bruce Sims  
P.O. Box 309  
Petersburg, AK 99833

JAN 6 1998  
**Tongass N.F.**

Re: Crystal Creek Timber Harvest DEIS

Dear Mr. Sims:

Thank you for the opportunity to comment on the Crystal Creek Timber Harvest DEIS.

Timber Demand

12-1 As you may know, FSEEE has appealed the Tongass Land Management Plan (TLMP), which sets the goals and objectives for this project area. You may obtain a copy of our appeal from your regional office. Among other things, the appeal asserts that TLMP fails to properly balance protection of non-timber uses with meeting market demand for timber over the planning period, as required by the Tongass Timber Reform Act (TTRA). TLMP's failure results from its arbitrary designation of 267 mmbf as the allowable sale quantity (ASQ), an amount far exceeding the agency's own projections of timber demand over the planning period. See Brooks and Haynes, "Timber Products Output and Timber Harvests in Alaska: Projections for 1997-2010."

The Crystal Creek DEIS relies upon TLMP's flawed projections of timber demand for the DEIS's Purpose and Need: "The purpose of this project is to implement the 1997 [TLMP] . . . The need for this project is to contribute to an orderly and a sustained volume of wood fiber to meet local and national demand . . ." DEIS at 1-1; see also 1-2 (DEIS relies upon and cites TLMP's Appendix L). FSEEE has explained in its TLMP appeal the many flaws in TLMP's economic analysis; in particular, that the Forest Service arbitrarily ignored its own expert economists' analysis. To the extent the Crystal Creek DEIS relies upon that analysis, it is similarly deficient.<sup>1</sup>

12-2 Inexplicably, the Crystal Creek DEIS's Appendix A, which purports to estimate demand for timber, completely ignores the agency's acknowledged best analysis of timber demand – the Brooks and Haynes report (nor is this study cited anywhere in the DEIS). Instead, the DEIS planning team puts forward its own timber demand "analysis" in Appendix A, which can only be dismissed as amateurish, given the fact that the Crystal Creek planning team includes not a single qualified economist.

Notwithstanding the Forest Service's apparent intent to sell less timber in the up-coming several years than allowed by TLMP's overstated and illegal allowable sale quantity (ASQ), the damage TLMP's inflated ASQ does to the land base available for multiple-use protection is real and substantial. But for the inflated ASQ, the amount of old-growth forest, such as that proposed for logging in the Crystal Creek DEIS, available to be protected for fish, wildlife, water quality, and other resources would be substantially

<sup>1</sup> The DEIS's Appendix A shows the direct linkage between TLMP's ASQ and this sale: "Considering the timber harvest program objectives for the Tongass National Forest, and the Stikine Area's contribution to those program objectives, the proposed harvest of 16 mmbf from the Crystal Creek Project Area is reasonable and valid." App. A at 4. But, if FSEEE is correct that TLMP's timber harvest program objectives overstate future demand, then Crystal Creek's proposed harvest is unreasonable and invalid.

greater. The Crystal Creek timber sale(s) would foreclose the opportunity to protect these forests in a revised TLMP, as FSEEE has requested in its TLMP appeal.

#### FSEEE's Tongass Land Management Alternative

FSEEE submitted a comprehensive land management alternative for consideration in the TLMP revision process. The Forest Service arbitrarily refused to consider our alternative among the range of alternatives assessed in TLMP's final EIS. We have protested this violation of the National Environmental Policy Act in our TLMP appeal.

The Crystal Creek timber sale would foreclose full consideration and implementation of FSEEE's alternative plan for the Tongass. For example, this sale proposes to log old-growth forests that FSEEE's plan proposes for protection and fails to provide the stream protection measures called for by FSEEE's alternative.

In sum, this sale's foreclosure of FSEEE's alternative land management plan, without adequate consideration by TLMP, violates NEPA. If you do not have a copy of FSEEE's alternative for review, please contact us and we will send you one.

#### Endemic Mammals

As FSEEE documented in its TLMP appeal, TLMP fails to provide for a viable population of endemic mammals and the marten. Insofar as there is habitat for these species that would be harmed by this timber sale, this sale violates NFMA's duty to protect viable populations of all native vertebrate species. FSEEE asks that the sale's supplemental EIS evaluate the presence of endemic mammals, marten, and their habitats in the sale area, the effect the sale would have on these species, and the adequacy of TLMP's protective measures for these species.

The inadequacy of TLMP's protective measures is even more dramatically highlighted by USFWS's and ADFG's recommendations to increase the size of the small old-growth reserves within the Crystal Creek project area. FSEEE suggests the Forest Service heed these recommendations.

#### Clearcutting

TLMP defends clearcutting as the appropriate dominant silvicultural system on the Tongass. In this respect, the Tongass is unique among all 156 national forests as the only forest to buck the nation-wide trend toward decreased reliance on clearcutting. For 25 years, since the Church Clearcutting Hearings of the early 1970s, the U.S. Congress and American people have been steadfastly telling the Forest Service that they don't want their public lands clearcut. 16 U.S.C. § 1604(g)(3)(F)(i). And, for 25 years, the Forest Service has slowly been getting the message. Chief directive of June 4, 1992. Today almost all national forests have reduced their use of clearcutting substantially. Clearcutting on the national forest system has dropped from 283,000 acres annually in 1988 to 133,000 in 1993, and is projected to drop to 50,000 by 2000. Forest Service Program for Forest and Rangeland Resources: A Long-Term Strategic Plan (1995) at III-38. Today clearcutting accounts for fewer than 15% of all acres harvested and is projected to drop to 4% by 2045. *Id.*

FSEEE's TLMP appeal rebuts each of TLMP's defenses of clearcutting, as follows:

##### 1. Forest health reasons:

Dwarf mistletoe is a ubiquitous, native western hemlock parasite that reduces tree growth, lowers fiber quality and provides an entry for decay fungi. Mistletoe creates important habitat niches for many species, including marbled murrelets. Generally trees out grow their initial mistletoe infections; the parasite rarely, if ever, is a direct cause of tree mortality. The Chief's 1992 policy allows clearcutting only where lands require "rehabilitation" from disease. Thus, dwarf mistletoe simply cannot be used to justify clearcutting. These stands

do not require rehabilitation; they are healthy forests that sustain a wide variety of forest uses, including timber. To do so, as the TLMP does, allows the disease exception in the Chief's policy to swallow the general rule that clearcutting should be utilized only in rare circumstances. Nor does dwarf mistletoe adversely affect "forest health." It is a natural part of the biological diversity of the native forests of southeast Alaska. There is no evidence that dwarf mistletoe incidence has gone beyond the bounds of natural variability, nor does TLMP even attempt to evaluate this central concept of forest health and ecosystem management.

The Chief's policy allows clearcutting to "rehabilitate" stands adversely impacted by windstorms. TLMP argues for clearcutting because it decreases blowdown within harvest units (there's nothing left to blowdown), but admits the practice increases blowdown along cutting boundaries. *Id.* at G-8. Regardless, neither justification fits the Chief's criterion for rehabilitation after catastrophic blowdown. Nor does blowdown adversely affect forest health. Down trees are a natural part of a healthy forest environment. They play important roles in nutrient recycling and wildlife habitat. In fact, TLMP requires down trees be left after logging in many management prescriptions. TLMP cannot on the one hand argue that blowdown is "bad" to justify clearcutting and on the other hand argue that it must provide for down logs because they are good for biological diversity.

Clearcutting is also allowed under the Chief's policy to reduce the adverse effects of logging damage, and TLMP argues that clearcutting does so. *Id.* at G-8. However, clearcutting is not "essential" to accomplish this end, as the Chief's policy further requires. Other silvicultural techniques, such as group selection, and other logging methods, such as helicopter logging, can accomplish the same reduction in logging damage as clearcutting. TLMP's failure to even consider these alternatives in its assessment of clearcutting violates the Chief's policy and NFMA's directive that clearcutting be used only where it is optimal.

TLMP argues that clearcutting should be permitted because it will improve forest productivity. *Id.* at G-8. Even if true, the Chief's policy does not grant any forest productivity exception for clearcutting. Nor is forest productivity a component of forest health. According to TLMP, Alaskan soils in old-growth forests have naturally "low soil temperatures, poor soil aeration, excess water, and deep humus mats." *Id.* Thus, by TLMP's admission, this is the natural, healthy condition of these forests. These forests are already healthy; they don't clearcutting to make them any healthier.

## 12-3

### 2. Clearcutting favors spruce.

TLMP provides no evidence that the Tongass suffers from a spruce shortage. Absent such a showing, there is no rational justification for believing that spruce needs whatever additional assistance clearcutting might provide over group selection. In fact, TLMP fails even to consider the option of group selection as a spruce reproduction technique, although there is every reason to believe group selection would offer the same "open environment" and "increased sunlight" provided by clearcutting.

### 3. Clearcutting requires less road development.

Road criteria are not among the factors the Chief's policy allows to justify clearcutting. Thus, this justification, even if true, violates the Chief's directive. Further, helicopter logging eliminates the need for many roads, regardless of silvicultural system.

### 4. Clearcutting provides viable harvest economics.

Once again, harvest economics is not among the factors the Chief's policy allows to justify clearcutting. Thus, even if true, this justification violates the Chief's directive. In any event, it is irrational for the Forest Service to use harvest economics to justify clearcutting when the agency loses tens of millions of dollars each year through its timber sales program. If the agency really cared about economic efficiency, it would simply stop selling timber on the Tongass.



12-3

5. Clearcutting provides excellent natural regeneration.

The quality of regeneration is not among the factors the Chief's policy allows to justify clearcutting, so long as minimum stocking levels are met. Ironically, by TLMP's own admission, clearcutting provides not excellent regeneration, but excessive regeneration. *Id.* at G-9 ("Stocking control is usually necessary between the ages of 15 and 20, and almost all sites require some degree of stocking control."). The fact is, TLMP fails to demonstrate that regeneration is a concern for group selection or other non-clearcutting silvicultural systems.

6. Clearcutting is compatible with the use of standard logging systems.

Again, no where does the Chief's policy speak to logging systems as a permissible justification for clearcutting. It defies commonsense that the reluctance of southeast Alaska's timber industry to invest in appropriate logging equipment should justify TLMP's decision to violate national policy disfavoring clearcutting.

7. Clearcutting provides a viable timber management program.

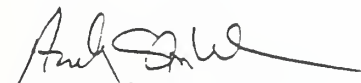
This last justification is the lamest of all. First, once again, it is not among the Chief's permissible justifications. Second, it alleges that clearcutting is necessary to "meet our contractual obligations to the long-term Contractors." Well, there ain't none anymore. This is one more example of TLMP living in the past. Third, TLMP claims that clearcutting is necessary to provide a timber program large enough to meet demand. But, as discussed above, TLMP grossly overstates demand. Finally, TLMP claims that clearcutting "permits the allocation of large parts of the Forest for other than timber management purposes." But, so would reducing the allowable sale quantity to a level consistent with actual demand, without any clearcutting.

In sum, to the extent that the Crystal Creek timber sale relies upon clearcutting, FSEEE believes that reliance is illegal, arbitrary and capricious, and violates the Chief's directive. We do not believe that the Forest Service can justify clearcutting under the law and challenge this sale's planners to address head on the points we raise above.

Summary

We recognize that district and area-level staff are faced with a difficult job of implementing a forest-wide plan that is poorly conceived and illegal. We would have preferred to have the issues we raise in these comments to have been acknowledged and resolved by TLMP. They have not been. It would be imprudent to proceed with on-the-ground implementation of a fatally flawed TLMP. Thus, we raise these issues here in the hope that the Forest Service will re-think TLMP and grant the relief we seek in our TLMP appeal. If it does not, we may appeal this timber sale or seek its stay pending resolution of our TLMP appeal.

Sincerely,



Andy Stahl  
Executive Director

P.S. I would appreciate receiving from you a copy of the "commitment" Region 10 has with the SBA to provide 100 mmbf of timber region-wide through the SBA program. Thanks for your help.



## Forest Response to Forest Service Employees for Environmental Ethics

- 12-1: These comments are beyond the scope of the Crystal Creek Planning Team's area of responsibility. On May 23, 1997, Phil Janik, Regional Forester signed the Record of Decision for the Tongass Land Management Plan Revision. Until such time as this Plan is modified as a result of further analysis by the Forest Service, or as a result of litigation, this Plan is the management direction for the Tongass National Forest.
- 12-2: The draft Brooks and Haynes Report (June 1997) was included in the Forest Plan errata sheet and therefore was incorporated into the DEIS. The final Brooks and Haynes Report dated September, 1997, is included in the Final Crystal Creek EIS planning record. This analysis was used to develop ``*Reasons for Scheduling the Crystal Creek Timber Harvest Project*'' which replaces the DEIS Appendix A.
- 12-3: Our direction is based on the 1997 Tongass Land and Resource Management Plan which was effective thirty days after the Notice of Availability was placed in the *Federal Register*.
- 12-4: See Response 2-1.

Jan. 2, 1998

Received

Patricia A. Grantham  
Acting Forest Supervisor  
Sitka Area

JAN 6 1998  
Tongass N.F.

Dear Patricia

I have studied the Draft Environmental Impact  
Statement for the Crystal Creek Timber Harvest.  
I wish to offer my suggestion for a simplified  
solution to what appears to be a very  
complicated issue.

As for cell - the arrangement with Annie Bell  
was that if the log transfer dump area needed  
to be used, he would have to move his equipment  
and let that take place.

This present site would be ideal as is for  
loading logs onto barges.

It appears that the State of Alaska wants to use  
their forty acres just for gravel sales -  
and if that is their concern, then a gravel  
loading place at Ketchikan Creek would be a  
good location for it - I am enclosing a  
bit of map so you can size that up. The  
agreement one had with the state was that he  
was to clear up the area that he removed gravel  
from and re-plant. That didn't take place so  
I expect things will continue as is and go  
there is gravel for a long stretch to wards Ketchikan  
Creek - that should be a good place to load it.  
The end of the road at the present site could then  
be fixed up better for recreation, boat loading  
and scenic views. Beautiful area -

Thanks for reading this.

Respectfully,  
Longwell Gask  
710 Pioneer St. #2  
Sitka, Alaska 99832

### **Forest Response to Ingvald Ask**

- 13-1: You are correct, should the Forest Service require the area used under the Special Use Permit, as a gravel barging site for log transport, we could displace the existing operation. However, at this point in time, we feel that both activities can operate at the existing site.
- 13-2: Your suggestion that the Delta Creek area on state land would be a good gravel pit operation site has merit and would reduce conflicts of the existing Thomas Bay log transfer facility and gravel barging operation. At this time, an additional gravel barging facility is not cost effective.
- 13-3: We will improve recreation access to the existing facility by building a new boat dock. This dock is presently under contract and will be completed in the near future. The general industrial look of the site will probably remain the same.



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**USDA Forest Service  
Stikine Area, Tongass National Forest  
PO Box 309  
Petersburg, AK 99833**

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